

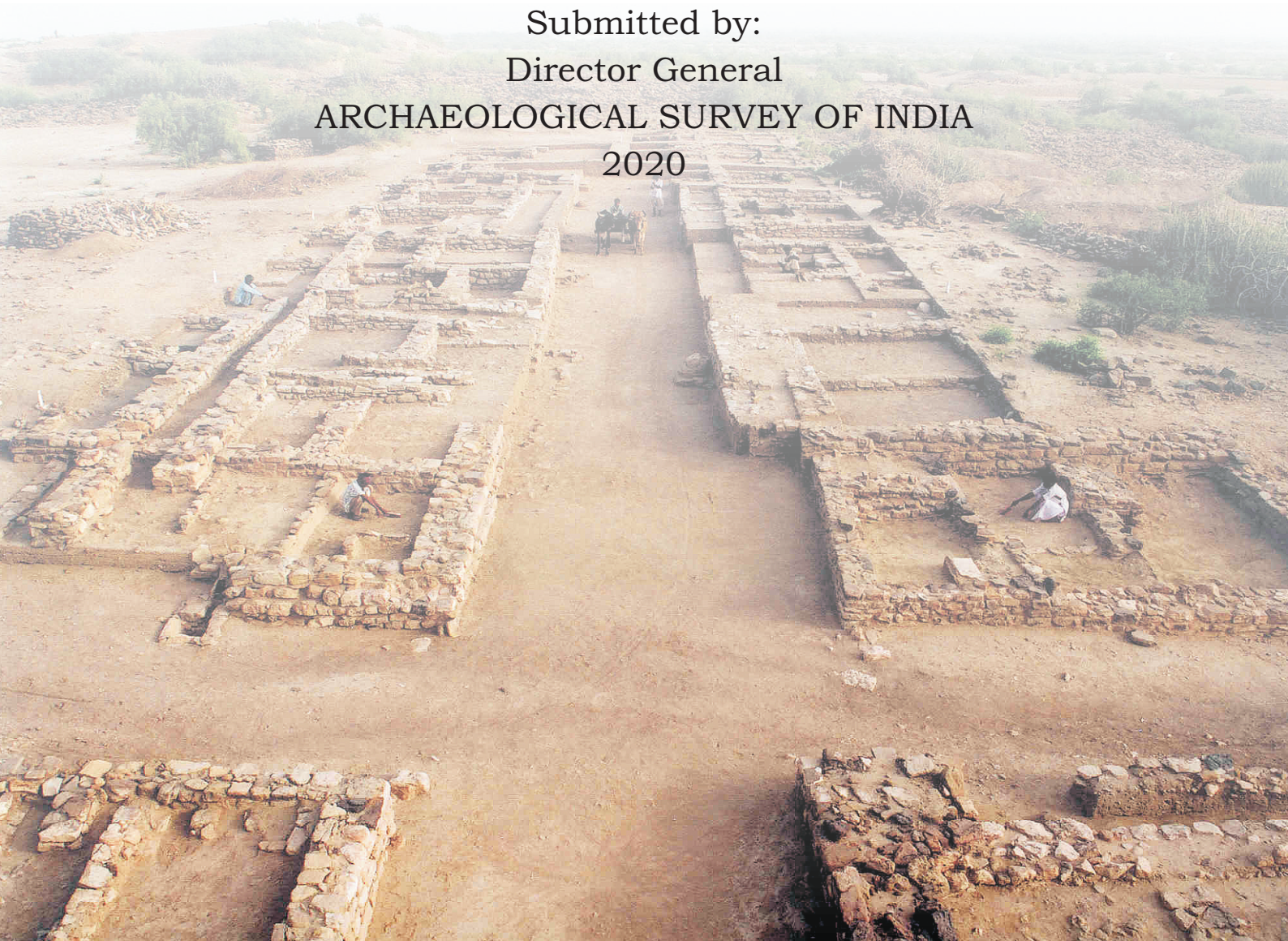


VOLUME I

NOMINATION DOSSIER

**DHOLAVIRA:
A HARAPPAN CITY**

Submitted by:
Director General
ARCHAEOLOGICAL SURVEY OF INDIA
2020











Property: Dholavira: A Harappan City

Submitted by

State Party	:	India
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CHAPTER 2: DESCRIPTION

2.A Description of property

2.A.i Introduction

Dholavira (23°53'18.27" N; 70°12' 47.89" E) is located on the isolated island of Khadir in the Great Rann of Kachchh in Gujarat. The archaeological remains within an overall fortification is located between two seasonal monsoon channels, known locally as Mansar (north) and Manhar (south). The archaeological remains encompassed within the outer fortification cover an area of around 70 ha and are ranked one among the five largest (may be six largest, if Lakhanjo-daro is taken into account and after Mohenjo-daro, Harappa, Rakhigarhi, Ganweriwala) Harappan cities and second largest in India (Rakhigarhi being the largest), of the Harappan civilization. The site was discovered by Dr. Jagat Pati Joshi, former Director General of ASI, in 1968, during his exploration in the Kachchh district. Joshi describes only two mounds in his report, a smaller and higher mound as 'citadel' and the other lower mound as 'lower town', fortifications, bastions, gateways, and the findings of Harappan material spread all over the site (Bisht 1991). Dr. R S Bisht (1991) also observes that Joshi "rightly pointed out that Dholavira is one of the largest Harappan settlements in India". Bisht (1991) further cites the work of Pandya, who substantiated the potentiality of the site.

While discussing the distribution pattern of the Harappan sites, Bisht (1989) observes that there is a fair concentration of sites on an east-west axis as well as in the northeastern part of Kachchh district in Gujarat. Another interesting feature is the presence of sites belonging to Harappan phase (c. 2600-1900 BCE) along the 'shoreline of Rann, the Kori Creek and Gulf of Kachchh coast' (Bisht 1989). The Kachchh region is devoid of perennial rivers and almost of them are ephemeral in nature. With an average rainfall of 300-400 mm, water is almost scanty except the aquifers in the limestone deposits, which support the livelihood as well as meagre agricultural practices. Bisht (1989) observes that the interest of the Harappans inhabiting this region was due to reasons other than agrarian unless summer cropping was followed in this region. The other reasons for occupation of this region could be the presence of mineral resources such as agate-carnelian, limestone, jaspers, shell, copper, steatite, timber and congenial climatic conditions during third millennium BCE, and others.

2.A.ii Rann and ancient geography of Kachchh

The Rann is a unique geographical formation in the world, and according to Bisht (1989) the Rann can be traced to the Rigvedic, 'Irina' and also with Ptolemy's 'Eirion'. The Rann occupies an area of 23,000 sq. km. and consist of two broad parts, namely, the Great Rann of Kachchh (in the north and west) and the Little Rann of Kachchh (in the east and southeast). The water level in the Rann is very shallow and is almost at the sea level. The Rann is connected to the Arabian Sea on the west through the Kori Creek and on the east by Gulf of Kachchh. The Rann is watered during the monsoon season by the drainage of the rivers flowing



into it like that of Rivers Luni, Banas, Sarasvati, flowing from the northeast and eastern directions and also from the rivers flowing from Saurashtra. Further, the Rann is also watered during summer due to the strong southwesterly winds flowing from the Arabian Sea aiding the seawater to enter the vast mud-flats. Even though the Rann is a vast mud flat land, the undulations in the terrain leads to differential depths when filled with water. The average depth ranging between 30 and 91 cm, but the maximum depth may reach up to 2 m at places. While during the months from November to March, the Rann remains dry, prolonged dry spells cause extensive drier environment, leading to vast stretches of salt encrusted surface, extremely white in colour and shining during bright sunlight and glittering during moon lit nights.

The dry conditions allow the Rann navigable through foot, carts and drought animals. The Rann is crisscrossed with several such land routes that were used by common public, traders and merchants and even armies in the past for several thousand years. The same tract is used using navigable boats or smaller ships when filled with water. Scholars also hold a view that the land level was lower, the Rann connected with the Arabian Sea, the Rivers Indus and Sarasvati drained into the Rann, contributing considerably to the water, thus making it more

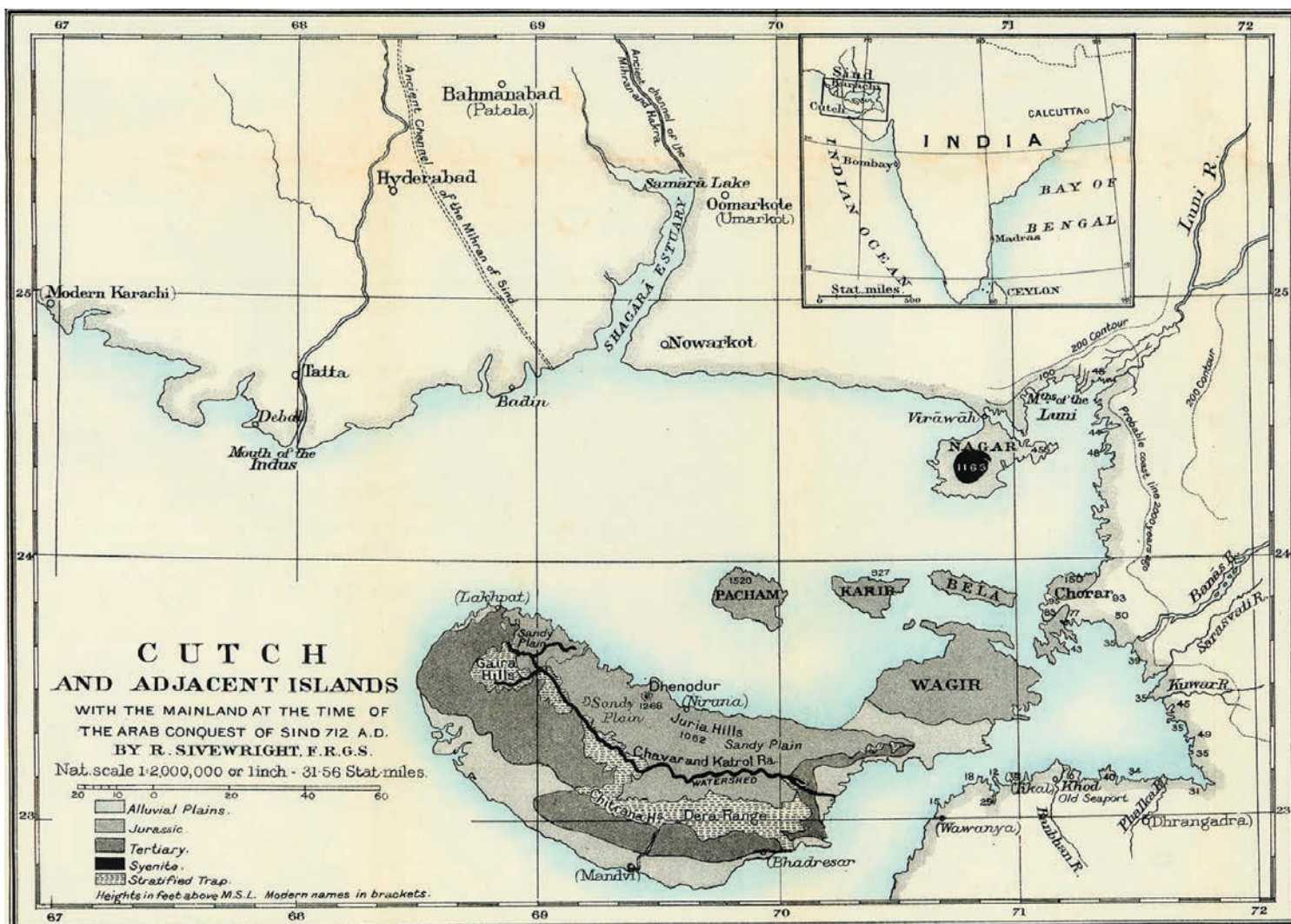


Fig. 2.1: Kachchh and adjacent islands (after Sivewright 1907)



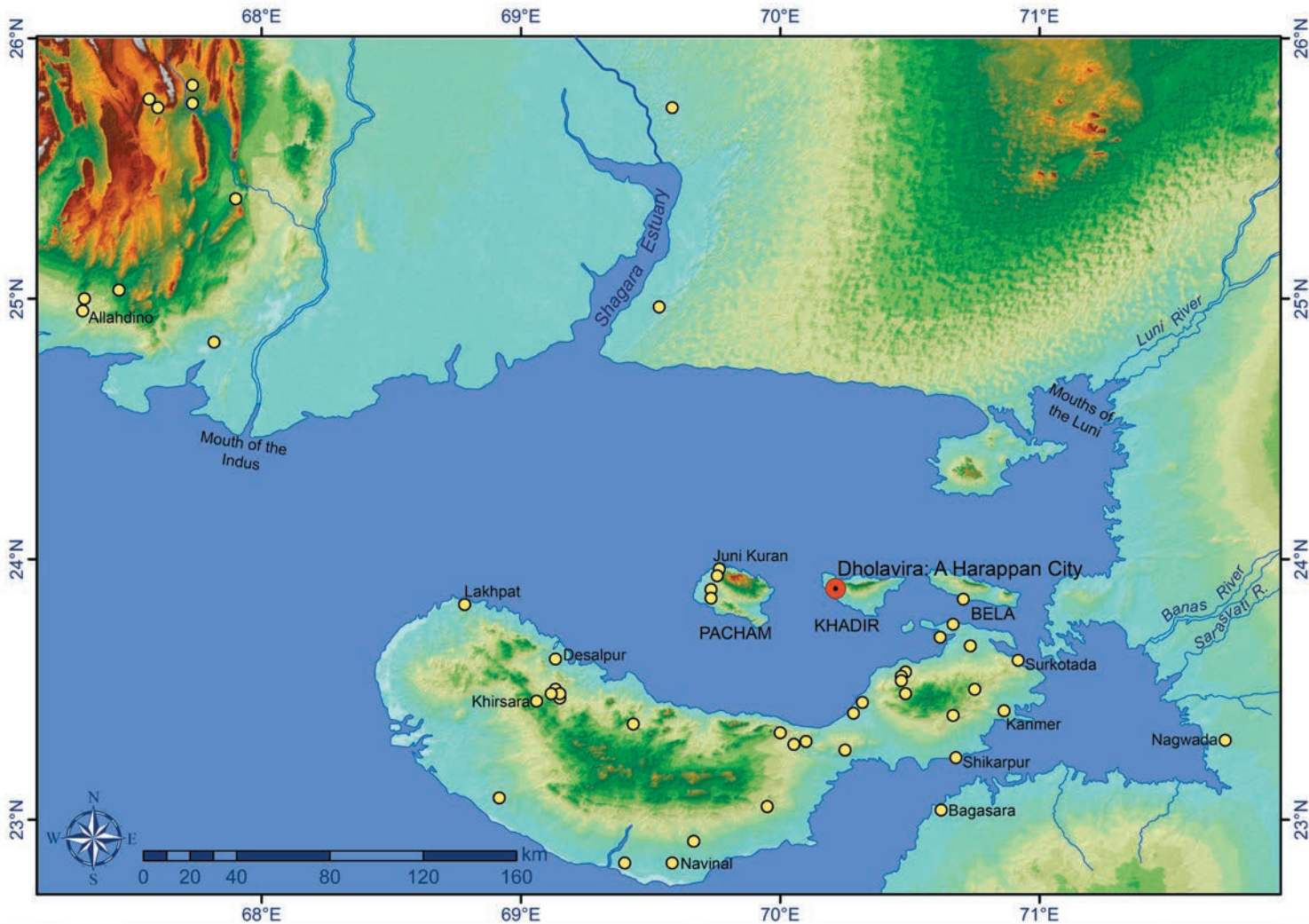


Fig. 2.2: Kachchh and adjacent islands during 712 CE along with Harappan sites (after Sivewright 1907)

suitable for navigation. The massive earthquake of 1819 led to devastating effects on the geomorphology altering the courses of the Rivers Nara and Indus, diverting them to reach the Rann. Bisht (1989) also mentions about the accounts of Alexander Burnes during the years 1827-28 during which he mentions about a local story of a ship-wreck on Pachham Bet, which led to the sailors to take shelter on Khadir island.

There could be several reasons for the location of Dholavira on the isolated island of Khadir in the Rann of Kachchh. The coastline of Gulf of Kachchh was entirely different when compared to the present times. Sivewright (1907) observes that out of the seven islands existed roughly in the regions of modern Saurashtra and Kachchh during the period Alexander's invasion, only one has a sea coast all around (Khadir island on which Dholavira is situated). While five of those islands constitute the modern Kachchh, two others have joined the mainland Gujarat (Sivewright 1907). That the seafaring activities of the occupants of Kachchh was widely recognised, given due credit by the Emperor Jahangir himself and also for their shipbuilding capabilities, at least from 18th century onwards is recorded by the contemporary travellers. It has been reported that the Rann was navigable

during the period of Alexander, however the voyage was treacherous and many vessels wrecked near the island of Pachham, while a few sheltered along the coast of Khadir (wherein Dholavira is situated) (Sivewright 1907) (Fig. 2.1). The Periplus (1st c. CE) also gives a graphic account of the account of the Rann, which was navigable during that period. Further, the Periplus gives an account that east of the seven mouths of 'Sindus' lies another bay named Eirinos. It is also mentioned that the ships / vessels entering into this bay faced severe hardships due to the terrain and wrecks are very common due to the difficulty due to navigation. Sivewright (1907) also notices that the Rann was navigable even after a few centuries after the Sindh conquest by the Arabs during early 8th c. CE, and the town of Virawah located on the northern banks of Rann was a flourishing sea port. However, it is also noted that the Rann was shallower when compared to the period of conquest of Alexander. The above account clearly indicates that the Rann was slowly silted upon and the evidences that dates back to the periods of Alexander, Arab conquest of Sindh, and Mughals indicate the navigability of Rann and also the tradition of inhabitants of Kachchh as experts in seafaring navigation. If such is the scenario, it can be clearly understood that further back during the Harappan period, the Rann was definitely navigable as is also indicated by the location of Dholavira in the island of Khadir.

Further, the Rann had undergone morphological changes in the recent past that has altered the coastline in a major manner. Several reasons have been postulated by scholars including (i) significant shift in the course of River Indus westwards (Flam 1999), (ii) the variations due to the due to the palaeoclimatic changes in Rajasthan and Kachchh, which contributed to the fluvial / marine cycles, (iii) eustatic activities, (iv) recent tectonic changes Gaur *et al* (2013). Sivewright (1907) also points out to the broad estuary to the east of the Indus delta, which corresponds to the drainage of present River Hakra (which is also identified with River Sarasvati). The combined deltas of Rivers Sarasvati and Indus could have served as crucial navigation channel network for the Harappans. Gaur *et al* (2013), based on the GIS analysis, indicate that if there was a sea level rise of 3 m, the significant changes could be observed in the Kachchh coastline, providing sufficient depth in the Rann making it navigable. In this regard, Merh (2005) indicates the connectivity of Rann of Kachchh and Gulf of Khambhat, through the Little Rann of Kachchh, Nal Sarovar region.

2.A.iii Kachchh

Kachchh is the largest district of Gujarat at present, and also presents a unique geographical feature. It is encircled by the Rann of Kachchh on the north and east, Arabian Sea on the west and Gulf of Kachchh on the south. In the past too, it was a conglomerate of smaller and bigger islands, the mainland Kachchh being the largest among them. The other islands like Pachham, Khadir and Bela prominently stood up in the past, with two of them, Pachham and Bela have now joined the mainland Kachchh and northern Gujarat respectively. The landscape is rugged, with isolated hill ranges and meagre monsoonal rains due to its location on the periphery of the zone of influence of south-west monsoon. The rivers on mainland Kachchh and the island are not of perennial nature keeping in view



of the meagre rainfall of around 322 mm on an average. The testing ground conditions in Kachchh led the inhabitants to innovate and experiment and to devise methodologies to store water from the meagre rains and to exploit the underground water resources. The extensive water management system noticed at Dholavira is a standing testimony of such conditions in the past as well.

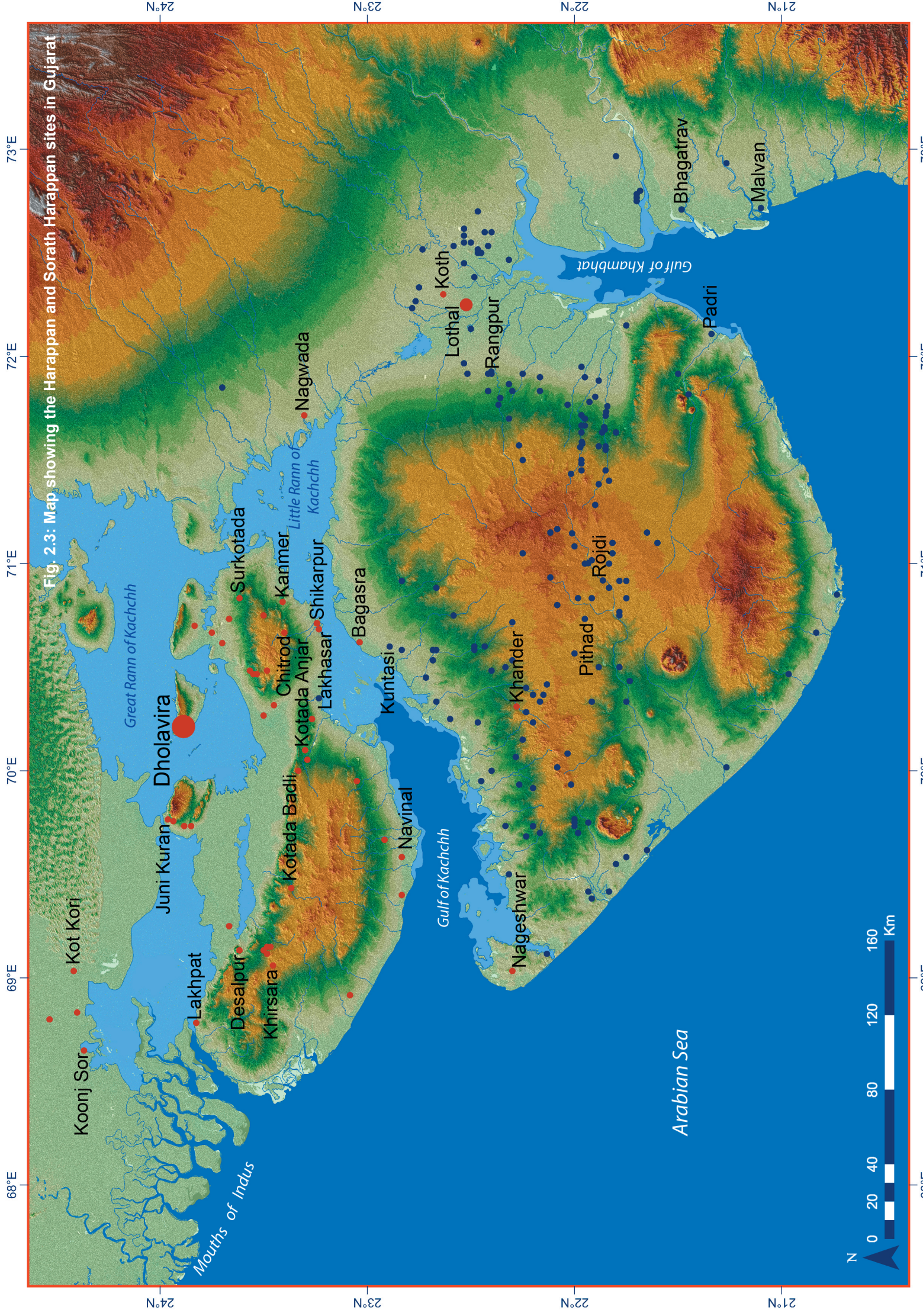
The Kachchh occupies an area of around 21,000 sq. km. the main occupation of the inhabitants being agriculture and livestock farming. Only 28% of the land is under cultivation and another 7.5% land available for forest, grazing and pastoral land. The main summer crops are bajra (pearl millet), jawar (sorghum, great millet), pulses, cotton and other fibrous plants, while the winter crops include wheat, sesamum and oil seeds. The mineral resources found on Kachchh are chalcedony, ochres, white clay, Fuller's earth (locally known as *mung mitti*), salt, gypsum. The maritime history of Gujarat and in particular Kachchh is well known even up to the historical times and the ports like Lakhpat, Koteswar, Jakhau, Mandvi, Mundra, Kandla, Tuna, Jangi, Kharohar are examples of the extensive maritime contacts with West Asia and Africa.

2.A.iv Khadir

Khadir is flanked by two other islands, namely Pachham and Bela, which stand like sentinels at a distance of 19 km east and 8 km west, respectively. Its location is also quite curious as it lies approximately in the centre of the Great Rann where the latter is the longest from east to west and broadest from north to south. Beyond the Rann, there lies Thar in the north and the mainland of Kachchh in the south. Spreading over an area of 196 sq. km, Khadir conforms to an inverted triangle. It is a 'tilted block', uplifted along the Pachchham-Khadir-Bela 'master fault' (Merh 1995: 131; Chowksey *et al.* 2010:467-490). Rising to a height ranging from 107 to 122 m above the Rann, a chain of cliffs which run straight along the east-west makes the northern side of the island a natural barrier, while, on all the remaining three sides, the land fans out and gently slopes down towards the Rann and thus determines its semi-radial drainage pattern on the habitable back slope, while radial on the whole.

Geologically, Khadir is formed primarily of Miocene (Middle Jurassic) rocks of Pachham formation consisting of siltstone, shale, marlites, clay stone, coralline limestone, pink, yellow and banded limestone, calcareous sandstone, overlain in parts by the Pliocene sediments of the Sandhan Formation mostly consisting of sandstones with conglomerate, clay stone, laminated siltstone and fossiliferous limestone [Chowksey *et al.* 2010: 469-471], and is covered along the margins with the Quaternary sediments which slowly merge with the surface of the surrounding Rann (Chowksey, *et al.* 2010: 483).

There are several highs and lows in the 'back slope', the latter being covered with cultivable soils derived from limestone or sandstones. These geological sediments were extensively exploited by the Harappans by quarrying over three million cubic metres of earth and rock for raising diverse constructions and fabricating an enormous amount of pottery and miscellaneous artifacts mostly for



local consumption and partly for export. The limestone of different hues— yellow, banded and black—besides the sandy limestone, is plentifully available and were extensively used.

Particularly, the limestone of fine quality was used for making a variety of architectural members which travelled even as far as Mohenjo-daro and Harappa (Randall 2011: 369-37, 393-94). Dishes and sundry artifacts of the same limestones were also exported to some other Indus towns, including Banawali. If we look at the quantity of such finished objects, it does not appear to have been such a lucrative trade, which would have added substantially to the prosperity.

No profitable minerals have been reported from Khadir, although the alluvium around contains a good percentage of small particles of chalcedony, which are too small for any industrial and commercial use. Cheriya Bet that projects into the Rann from the line of the northern escarpment of the island is reportedly covered by a thick scatter of agates, probably thrown up during Miocene. But the pebbles are said to be too small for manufacturing of beads and tools. Furthermore, there are found at places deposits of fuller's earth, coloured clays and china clay, which are not exclusive to the island. On the whole, Khadir is poor in such resources, which the Harappans could have craved for their large-scale industrial or commercial enterprises.

As the terrain is sloping, undulating, rocky and also devoid of water as well as good and continuous soil cover, the vegetation is sparse and xerophytic in nature. Anciently, like the rest of Kachchh, Khadir must have borne a denuded look when there were no exotic bushes (*gando bawal*, *Prosopis juliflora*) and trees which now impart a false appearance of greenery. The vast rocky tracks of rock do not allow any growth of trees except for shrubs and grass. There are some trees which can pierce their roots into the rocks but their growth remains stunted and gnarled, hence of restricted use for buildings or making tools and equipment except for firewood and sundry items or for use in unpretentious rural houses. The *pipal* (*Ficus religiosa*), *neem* (*Azadirachta indica*), *babul* (*Acacia nilotica*) and a few fruit trees grow under human care only where there is good soil cover. Although Khadir falls in the reserved wild life sanctuary there may be seen few deer, nilgai, wild hog, hyena, jackal, fox, small wild cats, the great Indian bustard and some species of birds and a great variety of migratory birds including the flamingo. The wild Indian ass (*khargoda*, *Equus hemionus*) stray into cultivated fields from the smaller mud islands in the Rann.

Khadir with its meagre rainfall of 262 mm per annum stands the second poorest in the region, only next to Lakhpat in the west of Kachchh, whereas the nearby islands are better off in comparison. Wettest months are July and August and partially September, while the winter rainfall is negligible. Therefore, the summer cultivation (*kharif*) are the main crops which comprise pearl millet (*bajra*), great millet (*jawar*), green gram (*mung*), brown gram (*muth*) and sesame, all being the staple food, in addition to wheat that is grown limitedly only where irrigation is possible. It also grows a few cash crops like cotton, cluster bean (*gawar*, *Tymopsis tetragonoloba*), cumin, castor seeds and plantago (*isabgol*, *Plantago ovata*).



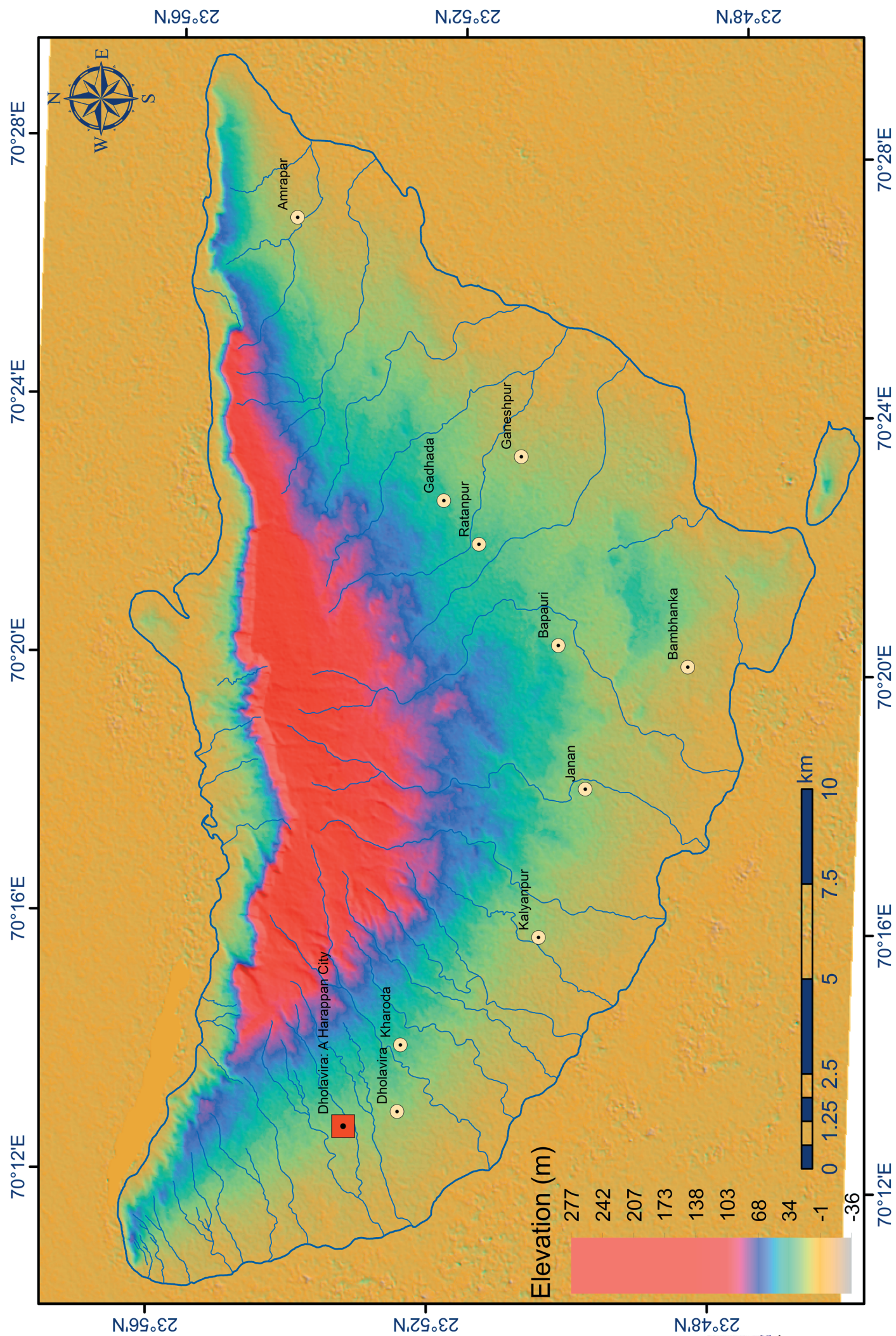


Fig. 2.4: Elevation Map of the island of Khadir

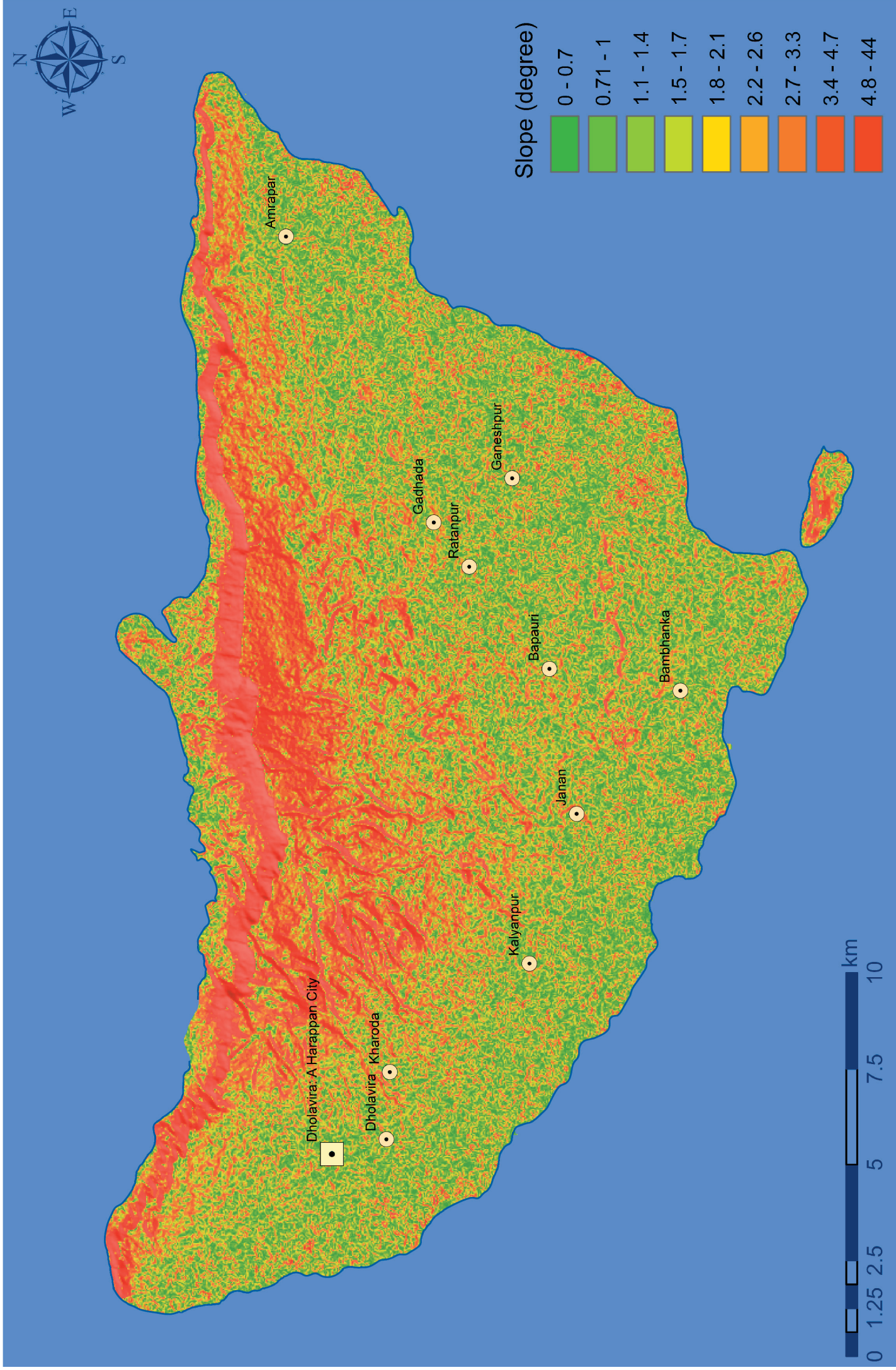


Fig. 2.5: Slope Map of the island of Khadir

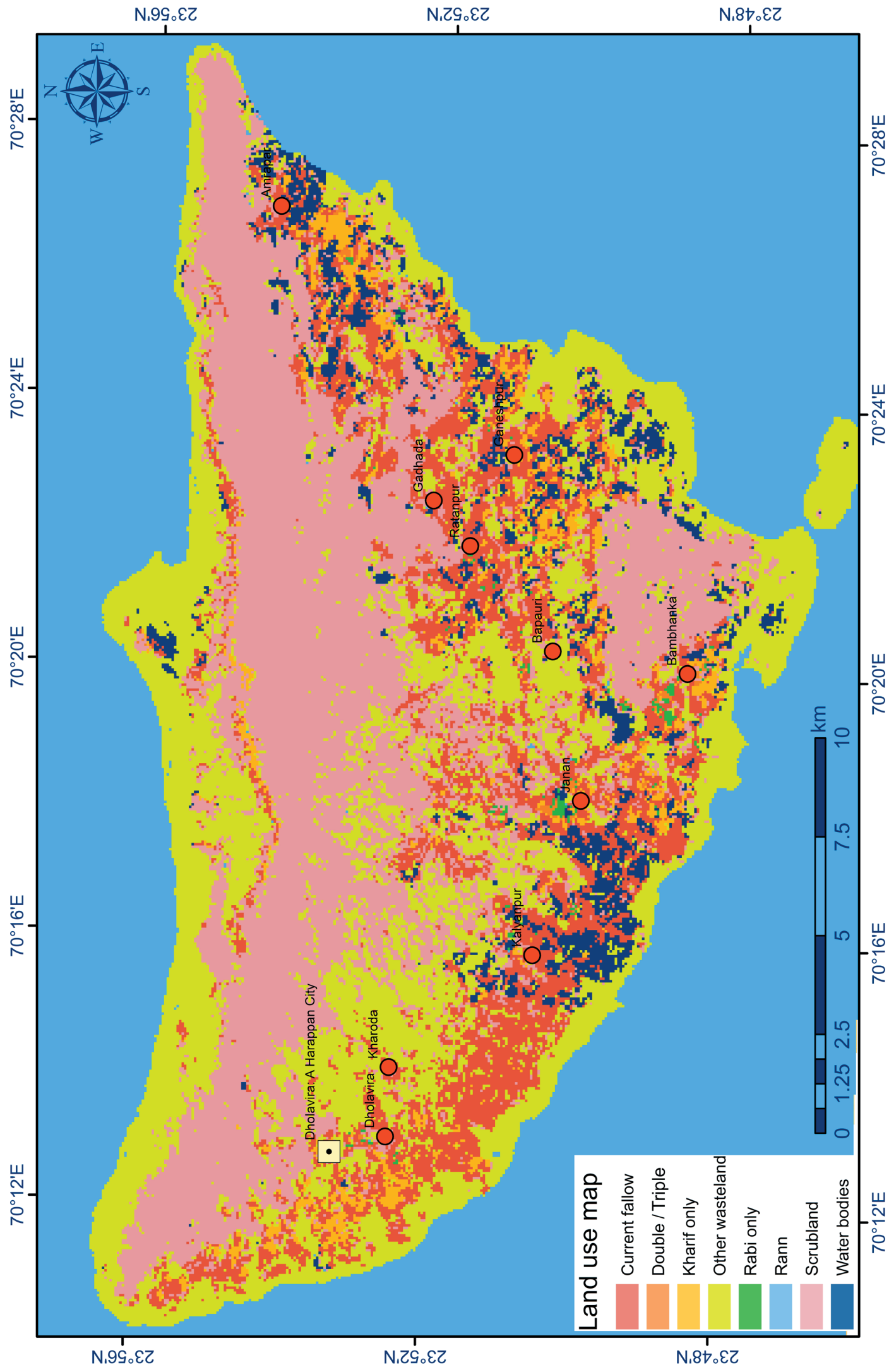


Fig. 2.6: Land Use Map of the island of Khadir

Cultivation is possible in small patches of sandy alluvial soil. A variety of wildly growing vegetables supplement the subsistence. Cultivation has thus limited potential.

Agriculturally, the Khadir is, thus, not a viable land. That is why it supported, according to the census of 1961, hardly a dozen villages having a population below three thousand souls giving the density ratio of 14 persons per sq. km as against the 33.3 for the entire Kachchh. Even now, there are no towns or markets in the island, save for one or two small village shops keeping sundry provisions for local consumption in a village.

However, the island provides a good pasture land, famous for its nutritious grasses, one of which has lent its name to the island. The livestock comprises cattle, goats, sheep, donkeys and camels necessarily, and horses and buffaloes sparingly. The pets are dogs and cats. For nomadic pastorals, dogs are necessary companions. Milk and its products are also very important food items.

Khadir, therefore, provides a little attraction. The only redeeming feature is its aquifer trapped in the soft and fragile sedimentary rocks of limestone, which has good permeability and water-bearing capacity. The problem arises in the event of consecutive droughts when all artificially created water bodies and wells go dry. This phenomenon is more usual than exceptional. One interesting feature that is noticed is that Dholavira was yielding sweet potable water from its wells all throughout even during those four years of severest drought of the century that brought about untold miseries. If to leave aside the proto-historic times, Khadir never played any significant political, social, or economic role during historical times. Therefore, on the present showing, the presence of the spectacular Harappan town of Dholavira remains a riddle. There should have been some other profitable factors for which it is better to look beyond. It is more imperative in view of the impressive array of the Harappan sites in the land of Kachchh.

2.A.v Salient features of the findings from the excavation at Dholavira

The ancient ruins, including the cemetery, cover an area of more than 70 hectares, half of which is appropriated by the articulately fortified Harappan settlement alone.

In India, Dholavira is one of the two largest known Harappan settlements the other being Rakhigarhi in Haryana, and may probably rank the fifth (possibly sixth, if Lakhanjo-daro, in Pakistan near Sukkur is taken into account) in the sub-continent, following Mohenjo-daro in Sindh, Ganweriwala and Harappa (both in Punjab, Pakistan), in terms of area coverage and perhaps, in hierarchical status. Ever since their discovery, the ancient mounds of Dholavira had aroused great curiosity among archaeologists. After a lapse of almost two decades, there was carried out a systematic survey and documentation of the visible structures and other features of the mound and their environs. It made it obvious that it was, **perhaps, the best-planned Harappan city with several divisions and many new features hitherto unknown.**



The mounds, (two of them being locally known as ‘Kotada’ and ‘Bazar’ specifically, while the others remaining unnamed), are located less than 1 km northwest of the village. The ancient remains are embraced by two seasonal torrents, namely the Mansar and the Manhar, which emanate from the hills in northeast and flow in their defined beds cut through the motley terrain of rocks and alluvium till they join each other before running into the Great Rann. These are ephemeral streams, which carry a heavy volume of water after downpours in the catchment area but dry up quickly within hours. There is, however, no perennial source of surface water other than the artificial lakes and ponds, which, too, are solely dependent on the monsoon.

The site of Dholavira was excavated for thirteen field seasons between 1989 and 2005, which brought to light seven cultural phases including early Harappan, Harappan phase and late Harappan phases, spanning for nearly 1500 years (Bisht, 2017). One square kilometre of the area bearing antiquarian remains was brought within the Grid Square Quadrant (GSQ) system and divided into 100 grids – each measuring 100 x 100 m; each grid was further divided, into 100 squares of 10 x 10 m each; and each square, as usual, was subdivided into quadrants of 5 x 5 m each. Both grids and squares thus had rows of tens either way. Serial numbers denoted by Arabic numerals ran from north to south starting from the north-east. In case of quadrants, numbering was clock-wise from the north-east. To elucidate, 11 x 20 x 4 represents the 4th quadrant of 20th square

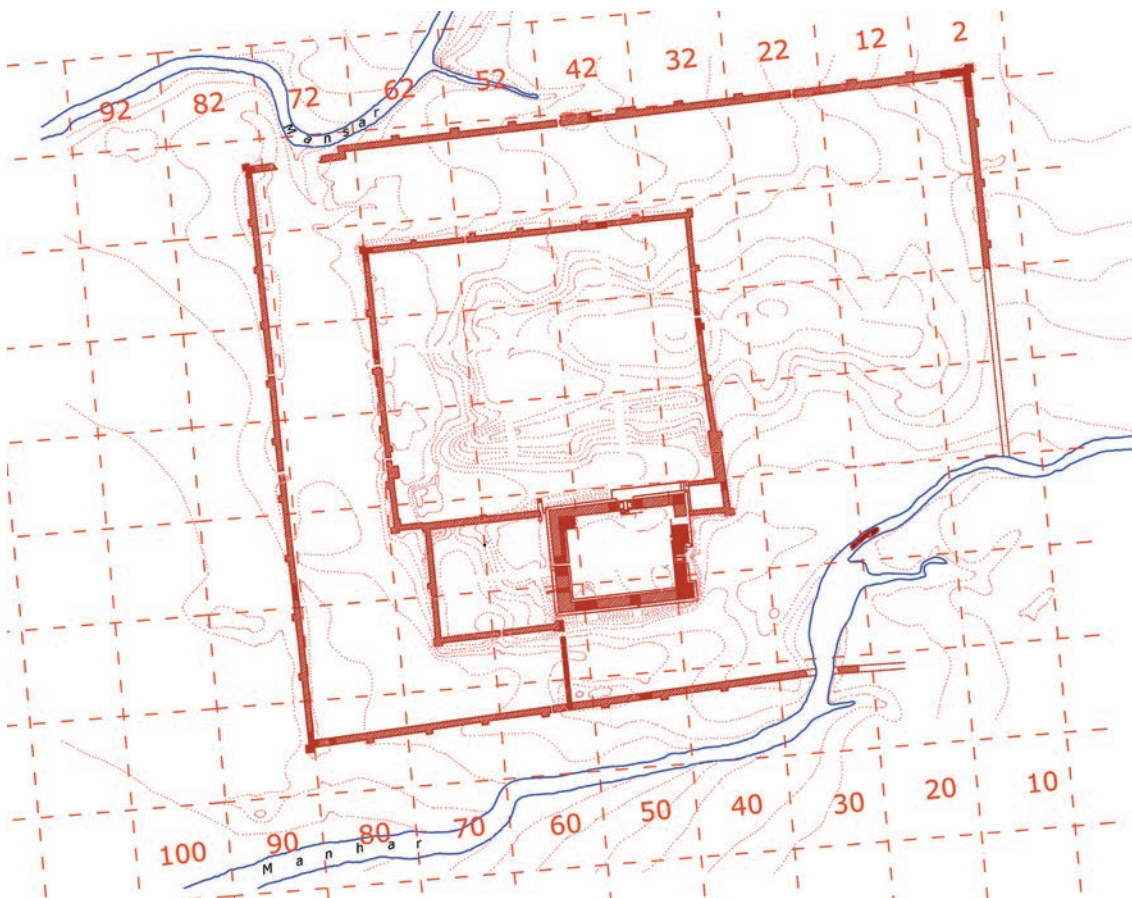


Fig. 2.7: Plan showing the grids of 100 m X 100 m each followed for planning the excavation



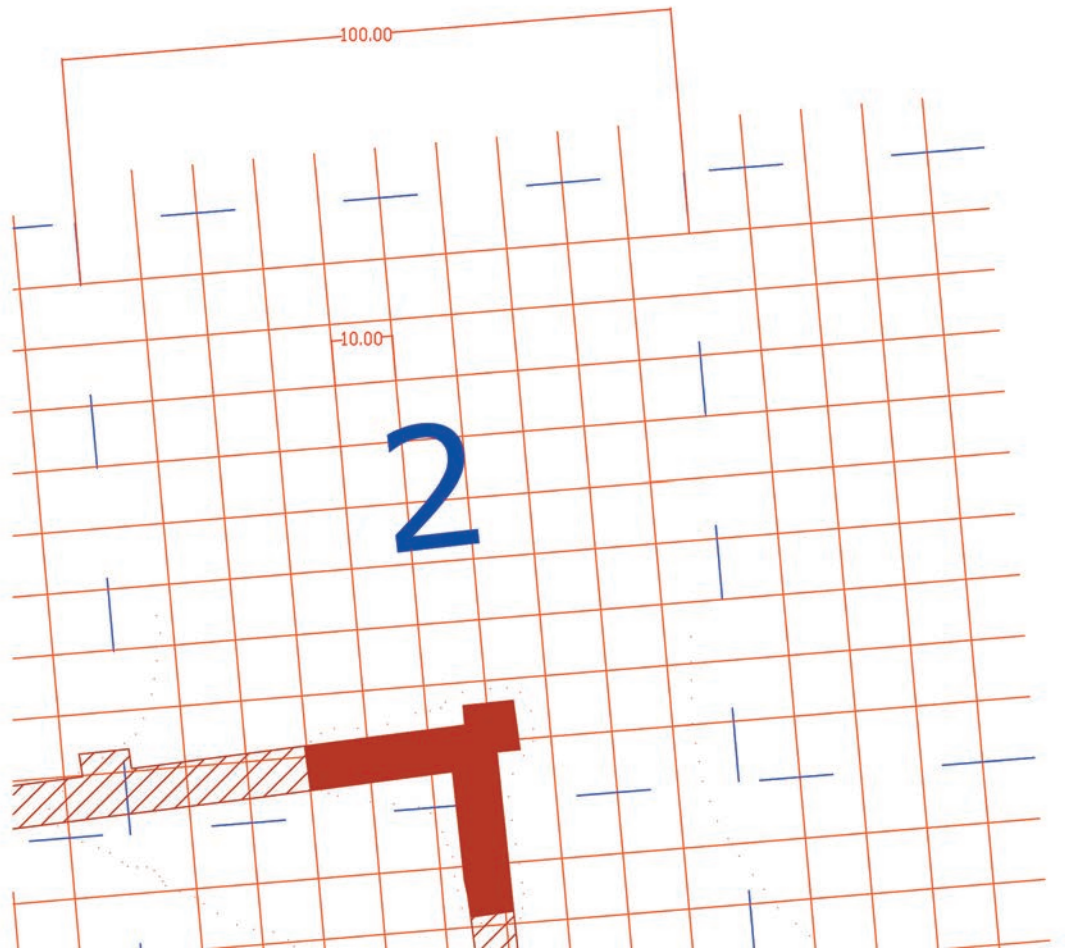


Fig. 2.8: Example of a Grid (100 X 100 m) and Square (10 X 10 m)

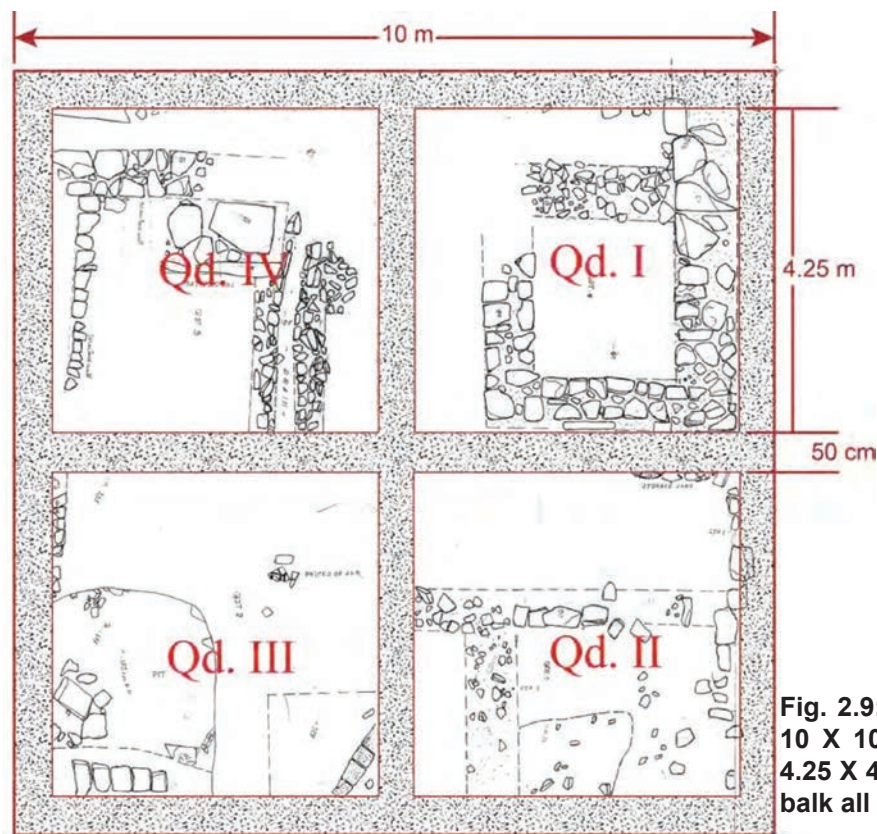


Fig. 2.9: Example of a Grid of 10 X 10 m and Quadrants of 4.25 X 4.25 m each with 50 cm balk all around

of 11th grid.

The salient components of the full-grown cityscape consisted of a bipartite 'citadel', a 'middle town' and a 'lower town', two 'stadia', an 'annexe', a series of reservoirs all set within an enormous fortification running on all four sides. Interestingly, inside the city, too, there was an intricate system of fortifications. The city was, perhaps, configured like a large parallelogram boldly outlined by massive fortification walls with their longer axis being from the east to west. On the bases of their relative location, planning, defences and architecture, the three principal divisions are designed tentatively as 'citadel', 'middle town', and 'lower town', the terms of which the excavator R.S. Bisht (1990) borrows from *Rigveda* namely *parama*, *madhyama* and *avama*. Bisht (1990) further mentions that these terms were used in the literature as equivalent to '...three different or types of divine or mundane horizons, zones, assemblies or settlements, rather divisions.' Bisht (1990) also refers to another later vedic literature, the *Atharveda*, mentioning the occupants of such divisions as *paramesthin*, *madhyamesthin* and *avamesthin*. These nomenclature for the divisions at Dholavira were adopted by the excavator and it is prevalent for identification of different parts of the city.

The **citadel at Dholavira, unlike its counterparts at Mohenjo-daro, Harappa and Kalibangan but like that at Banawali, was laid out in the south of the city area. Like Kalibangan and Surkotada it had two conjoined subdivisions**, tentatively christened at Dholavira as 'castle' and 'bailey', located on the east and west respectively, both are fortified ones. The former is most zealously guarded by impregnable defences and aesthetically furnished with impressive gates, towers, bastions and drainage. To the north of the citadel a broad and long ground, probably used for multiple purposes such as community gathering on festive or ceremonial occasions, a stadium and a marketing place for exchanging merchandise during trading seasons(s). Further north, there was laid out the walled middle town while to its east was founded the lower town. The last-mentioned one did not have an appurtenant fortification though it was set within the general circumvallation.

Besides to the south of the castle, across the adjoining reservoir, there was raised another built-up area running along the city wall, perhaps, designated as annexe or a warehouse meant for housing the retainers and menials. The layout that is briefly described above pertained to the fully-developed form of the Harappan city. There are identified seven major cultural stages, serially numbered from **Stage I to Stage VII which document the gradual rise, culmination and fall of the Urban System of the Harappan civilization** vis-a-vis the settlement which spread over a time period of one and a half millenniums spanning the whole of the 3rd millennium and half of the following.

Stage I

The remains of the first settlement belonging to Stage I lie buried beneath the castle. It was enclosed by a massive fortification wall. A part of its southern arm, running along the east-west axis, was cut across near the southwestern corner. Its basal width measured 11 metres and the extant height of the battered wall was



about 6.5 m. The height should have been much more originally, as part of the western arm, exposed within the thickness of the later wall near the western gate of the castle, appeared. It perhaps covered a larger area, particularly in the east where remains of a massive wall of identical nature and perhaps orientation too have been found running further eastward, beyond the southeastern corner tower of the later date. The foundation of planning that was laid in Stage I formed the nucleus on which the subsequent settlements of the later stages expanded into a full-fledged city. Even the building materials, whether standardized bricks (9 X 18 X 36 cm, ratio being 1:2:4) or stone, both undressed and dressed, remained almost the same. The artisans of this stage were fully well-versed in copper working, stone-dressing, bead-making, shell-working and advanced ceramic technology, as well as in planning and architecture. Items like triangular terracotta cakes, perforated, dishes-on-stand, basins and a reserved slip ware pottery, all of which would proliferate in the subsequent stages and become essential items of the Harappan culture, were present in Stage I at Dholavira from the beginning. The evidence of copper working during Stage I is indicated by the presence of large quantity of slags with greenish traces indicating the probable smelting process undertaken to purify the ore. It may be interesting to note here that Ambaji mines is not far from Dholavira which is one of the nearest copper ore sources. The cultural deposit of Stage I as evidenced from the excavation at the rain gully across the southern fortification of the Castle is 65 – 60 cm.

Stage II

In Stage II, a 2.80 m thick brick masonry wall was added to the pre-existing defensive wall from the inner side and the face of it has plastered over with fine paste of white and pink clays, at least, as many as thirteen times. The walled area would have been as large as that of the preceding stage, because the brick masonry addition of this stage was found abutting the wall segment of Stage I that runs outward in the east. There is another significant development that took place. A residential area was coming up to the north of the walled settlement. Besides, pottery forms and antiquities diversified as well as increased in both quality and quantity. Otherwise, the pottery forms found in Stage I continued in terms of fabric and typology. **The pottery types of Stages I and II can be comparable with those found from the site of Amri in Sindh area of Pakistan. The pottery can be comparable with Period IIB of Amri and thus could be datable to the early part of third millennium BCE.**

Stage III

Stage III, sub-divided into two phases, i.e. IIIA and IIIB, was most creative and important period in many respects: the southern arm of the antecedent fort-wall was further widened from the inner side with an additional brick-masonry of about 4.5 m and the pre-existing walled settlement was made into a castle while another walled subdivision, arbitrarily called as bailey, was added to it from the west; in the north, the extended residential area of Stage II was cleared of structures for carving out the aforesaid multipurpose ground; further north, the extensive walled town (which would become middle town subsequently) was founded; res-

ervoirs were created on the south, west and north of the built-up divisions on an ostentatious scale and design; and, finally, an outer fortification was raised to surround all the above components. For the first time, a seal of steatite, square in shapes, smaller and lighter but without inscriptions, appeared in addition to a potsherd bearing Indus signs and a solitary cubical weight.

Besides, a good number of classical Harappan pottery forms with painted motifs made their debut. When the town of Stage III had lived two-thirds of its life, it was immensely damaged by a catastrophe. Its tell-tale marks are vividly present in the defensive wall and in a salient of the castle. Repairs were undertaken, the lower town was added and the city-walls were extended further eastwards in order to enclose the new additions. As a result, the erstwhile town attained full cityscape that dominated the cultural scenario for centuries through Stages IV and V. Significantly, during the first three stages, i.e. I, II and III, the inhabitants exhibited an abiding preference for colourful clays, e.g., white and pink for plastering nearly all the structures whether defensive walls, roads, streets, ceremonial ground, or the walls and floors of private houses. Not unlikely, even rooftops of the houses might have been treated similarly but, this tradition came to an abrupt end with the end of Stage IIIB and beginning of Stage IV, as if under a royal decree or by a resolute public consensus. At Stage IIIB, the cityscape had thus attained its fullest growth.

Stage IV

Stage IV belonged to that classical Harappan culture which has been so widely familiar to the people at large as it has been exhumed and published from a large number of excavated sites like Mohenjo-daro, Harappa, Lothal, Kalibangan etc. and known as 'mature' Harappan. Almost all the salient features of the city planning were scrupulously maintained at Dholavira along with the monumental structures such as gateways, fortifications, drainage system. The famous ten-signed inscription of unusually large size was surely in use during this stage. All the classical Harappan elements such as pottery, seals, weights, beads, items of gold, silver, copper, ivory, shell, faience, steatite, clay and stones are found in abundance.

However, local elements particularly in pottery are rather more dominating the classical Harappan types. There is a great variety of fabrics, forms and painted motifs. Besides the fabric, forms and painting traditions of Stage III also persists alongside. The use of coloured clays, white, off-white, pink, deep pink, plastering of structures and flooring of houses, was almost like signature phenomenon, but, as soon as Harappans arrived, the use of these coloured clays was totally done away with. This phenomenon leads to believe as if there was a change in power structure, i.e. political authority with a different ideological orientation.

Stage V

Stage V is characterized by the general decline particularly in the maintenance of the city. It is more vividly reflected in the citadel. As it has been observed by



scholars, there could have been a laxity in the municipal administration of the overall city. The other items such as pottery, seals, weights, etc., of the previous stage continued in use, however albeit with some changes in ceramics.

The local ceramic wares show pyrotechnological deficiency, that is why those particular wares show tendency of becoming brittle, and flaking of in layers. Architecturally, they did not contribute anything, wherever there is a necessity of repairs, it was done in poor workmanship, however, it was not of a long duration at the site as it is reflected only in one structural phase. This phase too, also ended with the devastation of an earthquake, however, even sometime in the middle of this stage, the financial weakness if glaringly manifested in the evidence that the floods which devastated the water structures could never been made functional obviously due to increasing poverty, i.e. lack of resources. This stage was followed by a temporary desertion of the site, perhaps not lasting more than a few decades before the Stage VI ushered in.

Stage VI

Stage VI presents a state of cultural transformation. New ceramic traditions com-

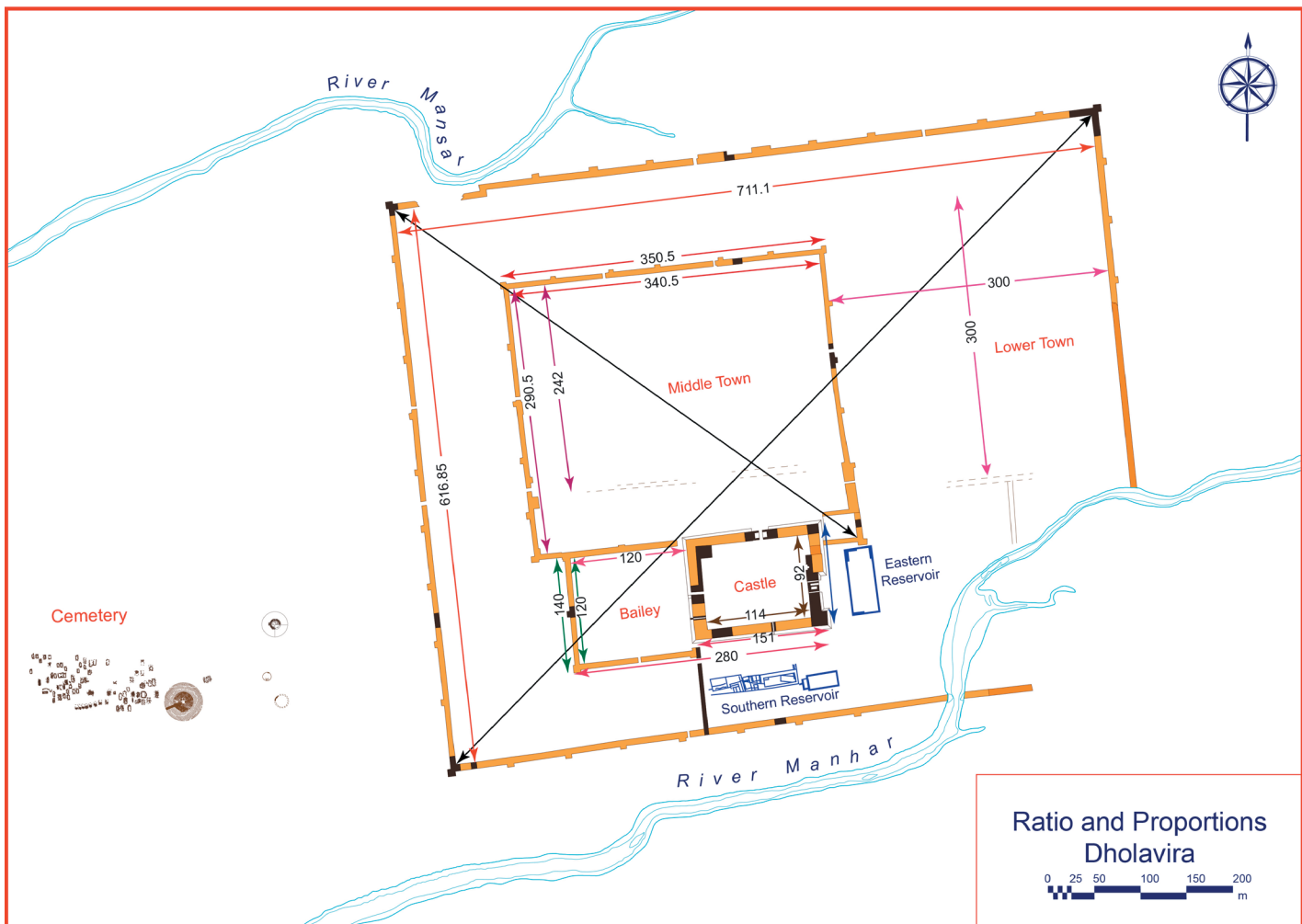


Fig. 2.10: Plan of Dholavira showing the ratios and proportions

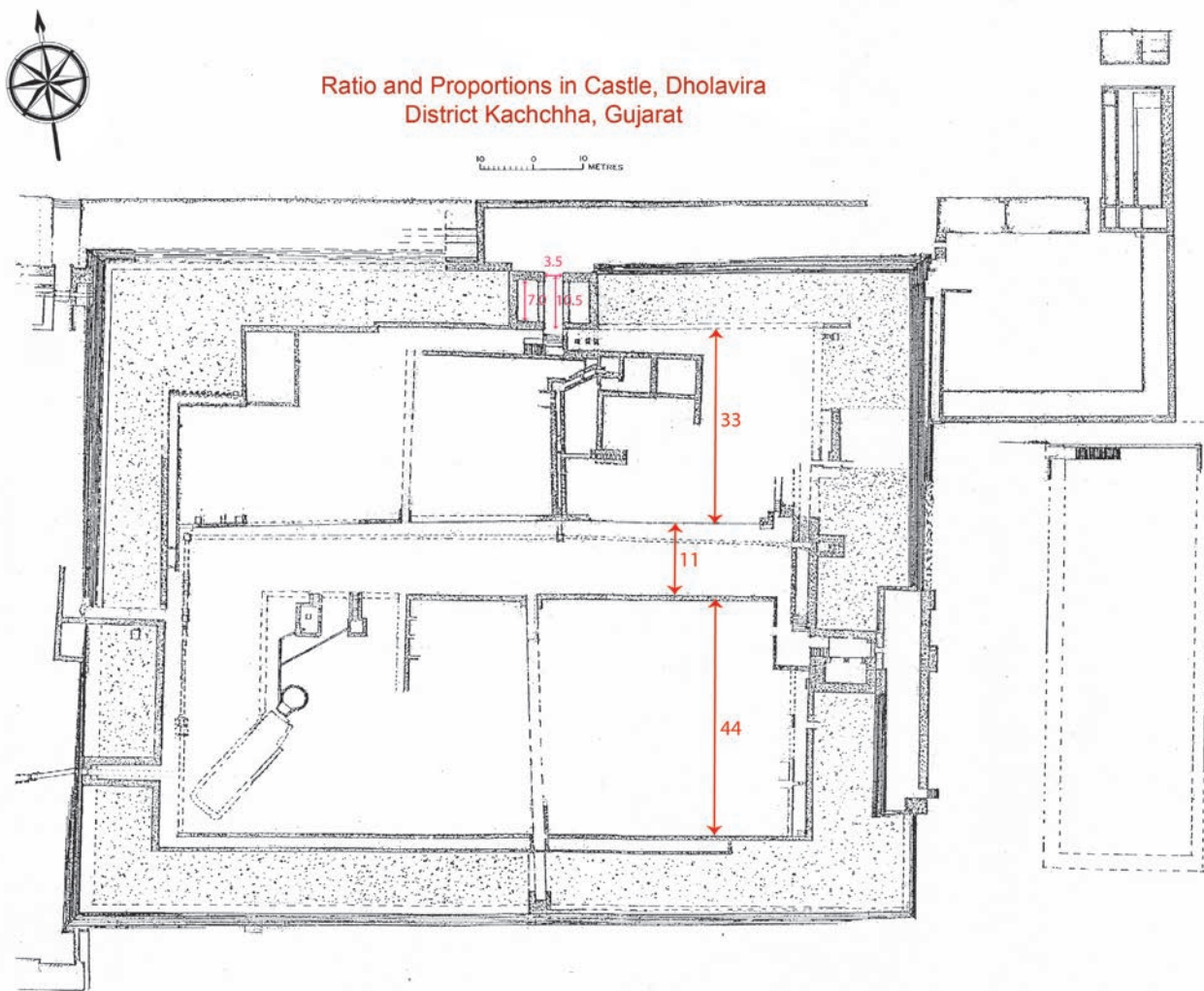


Fig. 2.11: Plan of Castle, Dholavira showing the ratios and proportions

ing from the sides of Sind, Rajasthan, Gujarat and far-off regions in the north made their appearance. The one-time city shrank into a smaller town, confined to the citadel and the southern margin of the middle town only although some of the existing fortification walls were kept in use; a new wall of different construction was raised on the north for delimiting the settlement. The classical planning was largely given a go-by. Domestic buildings were laid out in a different planning. Bricks were no longer in use. While many of the pottery forms and decorative motifs of the mature period were still in vogue, new ceramic wares in the form of white painted black-and-red and black painted grey wares along with a coarse ware bearing incised or appliqué or both kinds of designs and also some Bara related pottery made their appearance.

Many other traditional items continued in use though the seals underwent a drastic change. Rather being square in form, those were long rectangular with a flat or triangular or wagon vault back with a hole for passing a string. The seals still bore nicely cut inscriptions but, no one with any motifs. Beside the cubical weights of chert, etc. being still in use, some cut out of potsherds were also introduced. Overall picture that is projected is that impoverishment and rapidly crumbling urbanism. Having lived there for about a century or more the late Harappans of



Stage VI abandoned the settlement.

Stage VII

The above-mentioned desertion was certainly of a longer duration. How long? It is not certain at present. The new comers of Stage VII had forgotten all the classical Harappan fabrics, shapes and designs. Strangely enough, the newcomers built their houses in an entirely new form that was circular, so called known as *bunga* or *kud* and can still be seen in a greater part of rural India. No planning as such is discernible. All the urban attributes became conspicuous by their absence. Thus the urbanization that made its humble beginnings in Stage I and went on progressing through Stages II, III and IV, started decaying in Stage V and underwent a transformation in Stage VI with a feeble revival only to become totally deurbanized in Stage VII. The site was never occupied thereafter. Lying between the monsoon channels and being undulating sloping towards the south, the site was ideally suited for a settlement having artificial dams and reservoirs.

2.A.vi Chronology

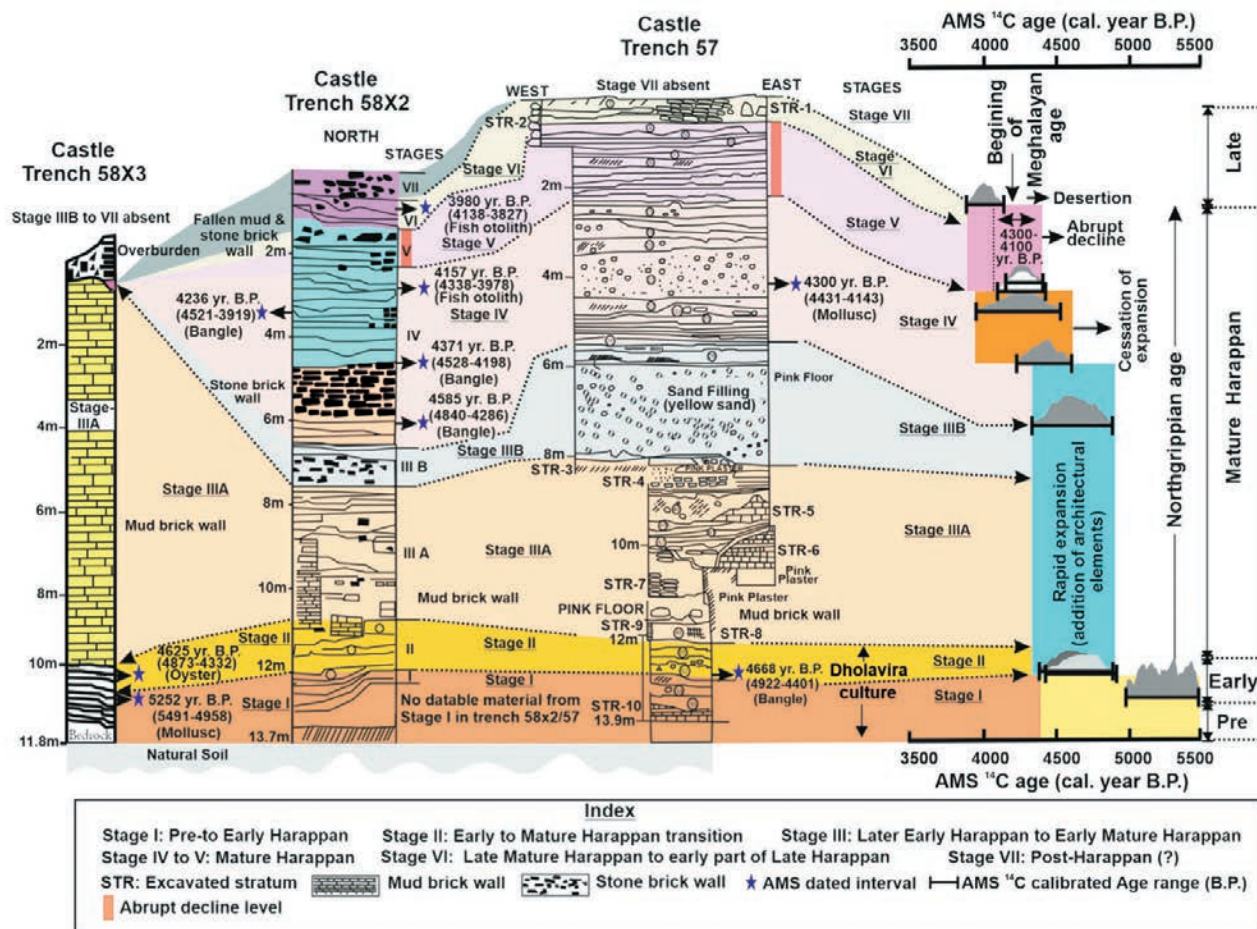
The chronology of the occupation at Dholavira has been arrived at based on the cultural remains and relative chronology of similar findings from other excavated Harappan sites. Thus, the excavator proposes an occupational record spanning nearly 1500 years for all the cultural stages, i.e. from Stage I to VII, starting from around 3000 BCE and ending around 1500 BCE. The excavator also observes occupational gaps in between Stages V & VI and Stages VI & VII. The chronology of the settlement is further substantiated by the radiocarbon dates obtained from molluscan samples from various levels which presents a cultural horizon of

Dholavira cultural stage	Radiocarbon age range (2σ, cal years BP)	Harappan period	Cultural elements*
VII	Younger than 3827	Late to post-urban (?) Harappan	No cultural similarity with the Harappans, urban features of classical Harappans completely absent, new circular rural houses
Temporary desertion and hiatus			
VI	4138–3827	Late Mature Harappan to Early Late Harappan	Reduction in city area, complete new tradition in pottery and building plans, classical pottery continued with declining form, fabric and reduction in size
V†	4157–3980	Late Mature Harappan	Declining phase of Harappan civilization, signs of lack of maintenance, no addition of architectures, pottery styles similar to classical Harappan 'standard wares' but poor craftsmanship; water reservoirs abandoned
IV	4840–3919	Late Early Harappan to Late Mature Harappan	Fully developed and extended city, classical Harappan pottery, seals and copper–gold–silver workings, cessation of expansion in later part
III†	4625–4585	Transitional phase, Late Early Harappan to Early Mature Harappan	Largest and most creative expansion of the city, mud bricks replaced by systematic use of stone bricks
II	4958–4332	Transitional phase, Early to Mature Harappan (Dholavira culture)	Aerial expansion of the city and fortification, developed pottery styles similar to typical Early Harappans in the type areas of Sindh and Mohenjo-Daro (Possehl, 2000, 2002)
I	5491–4958	Pre- to Early Harappan (Dholavira culture)	A fairly advanced cultural level with fortification walls, copper and shell working, standardized mud brick manufacturing

*After Bisht (2015).

†Harappan periods and age ranges are based on median ages (Table S4) and cultural elements of adjacent stages because no datable material was available.

Summary of the age ranges for different cultural levels at Dholavira (after Sengupta *et al*/ 2019)



Chronology with respect to three key trenches (58 X 3; 58 X 2 and 57) at Dholavira (after Sengupta *et al* 2019)

c. 3491-2958 to <1827 BCE which also substantiates the chronology arrived at by the excavator based on relative dating.

Cultural stages at Dholavira	Chronology	Cultural affiliation	Comparable with Harappa	
			Culture	Period
Stage VII	c. 1500 – 1450 BCE	Post Harappan	Late Harappan	Period 5
Stage VI	c. 1950 – 1800 BCE	Late Harappan		Period 4
Stage V	c. 2100 – 2000 BCE	Harappan	Harappan	Period 3
Stage IV	c. 2500 – 2100 BCE			
Stage III	c. 2800 – 2500 BCE	Dholavira culture	Kot Dijian	Period 2
Stage II	c. 2900 – 2800 BCE		Ravi / Hakra	Period IA & 1B (starting before 3700 BCE)
Stage I	c. 3000 – 2900 BCE			

Comparative chronology and cultural phases between Dholavira and Harappa

2.A.vii Settlement at Dholavira in general and its layout

The city of Dholavira in its fullest form was a precisely proportionate whole and proportionality resolved configuration following a resolute set of principles of planning and architecture with mathematical precision and, perhaps, with astronom-



ically established orientation. Of the city, at present, three corners with partially eroded towers but fully intact inner corners have been confirmed by excavation. When measured between the inner corners, the E-W length of the city area along the northern defensive wall and N-S one along the western one worked out to 771.10 m and 616.87 m, respectively – thus giving the precise ratio of 5 : 4. Similarly, the other divisions of the city also revealed amazing ratios and proportions. The following table provides revealing information:

Division	Width	Length	Ratio
City, internal	616.87	711.10	4 : 5
Castle, internal at available top	92	114	4 : 5
Castle, external (as per present exposure)	118	151	4 : 5
Citadel (castle + bailey), external approximately (including bastions)	140	280	1 : 2
Bailey, internal	120	120	1 : 1
Middle Town + Stadium, internal	290.45	340.5	6 : 7
Middle Town, excluding Stadium, internal	242	340.5	5 : 7
Stadium, internal	47.5	283	1 : 6
Lower Town, built-up area	300	300	1 : 1

The above table *inter alia* reveals the proportional relationship between the castle and the city so it does in respect of intra-divisional and inter-divisional measurements. It is interesting to give another illustration: the diagonal drawn between the two opposite angles made by the north-eastern and the south-western corners of the city touched the north-western corner of the castle. While of the remaining two, the south-eastern corner is still missing, or not found out, a line, therefore bisecting the north-western angle also bisected the north-western corner of the middle town and further on cut across a crossing of four streets and finally the north-eastern corner of the castle. This could have been achieved by precise mathematical calculations and drawings which were then translated on the ground that was undulating by 13 m in gradient. **It was indeed a great engineering achievement.** In the whole scheme, the enwalled area of the castle became 49th (7 X 7) part of the city while its total built-up area was 25th (5 X 5) part.

Furthermore, it is very significant that the two-thirds of the middle town and the whole of lower town were planned with bold projections and recesses just like those one finds in the layout of an Indian temple of the later ages. As a result, the city divisions were provided with a number of housing sectors and spaces. Some of latter were found to have been used for dumping domestic refuse. Another significant feature is the arterial street that ran across axially from west to east dividing all the above-mentioned units and sub-units into two equal halves, and a north-south street, perhaps somewhat staggered, further subdivided each unit. Thus, rendering each unit having four built-up areas subdivided by streets. This kind of layout of the town helped carve out six open spaces in between the surrounding fortification walls and the built-up areas.

The lower town, too, was resolved into several units. Each unit seems to be hav-

ing likewise projections and recesses and in turn demarcating an open space, of course. The arterial street of the middle town passed through a gate within eastern fortification wall and then went on running across the lower town albeit with a few turns, each at the end of a residential sector. The street however remained uninterrupted. Other major and minor streets and lanes shot off from the axial street for making a defined network of housing sectors. A brief of different parts of the settlement is given below for understanding the settlements:

2.A.vii.a Acropolis or Citadel consisting of Castle and Bailey

The Acropolis or Citadel is the tallest mound with occupational debris at Dholavira and lies prominent at the southeastern part of the settlement. The excavator observes (Bisht 1990) that even before the excavations the detailed surface investigations brought to light two conjoined divisions of this mound, each with separate fortification. The total dimensions of this mound measures 300 m E-W and 140-160 m N-S. The eastern division is more pronounced than the western one, rises to a height of 15 m and 18 m respectively on the south and west parts and almost twice the height of western mound. The castle measures 114 X 94 m (EW X NS), while the bailey measures 123 m square. The eastern division is named as Castle and eastern one, Bailey. The conjoined divisions deeply remind of the settlements at Kalibangan (Rajasthan) and Surkotada (Gujarat). While Kalibangan is an early and mature Harappan settlement, Surkotada is a later settlement, possibly established on the principles adopted from Dholavira, which in turn could have adopted the plan layouts from other existing settlements.

The excavation in the Castle brought to light the complete history of the settlement, as the habitation started in this part of the city in Stage I, around the beginning of third millennium BCE. The extant remains of Stage I could be noticed across the rain gully on the southern arm of the fortification, southwestern and southeastern parts of the castle. A broad central street (11 m in width), known as broadway divided this part of the settlement into approximately two divisions, the northern one measuring 33 m in width and southern one 44 m in width. However, due to the complete occupational debris of later periods, no complete house plan could be exposed of the mature Harappan phase (i.e. Stages IV and V) in either castle or bailey. All along the inner side of fortification are streets running in all directions, facilitating easy access and movement inside the settlement. The other important features of castle have been described in separate divisions like gates, stormwater drains.

The house complexes of Stage VII could be exposed in the castle, mostly on the northern portion. These house complexes are rectangular on plan, multi-roomed, constructed of stone blocks and laid along the E-W street and another street emanating from the North Gate, which runs along the northern arm of fortification and turn to the south midway of the northern division. This street was further blocked during Stage VI towards the southern end and hence its full configuration could not be ascertained. The plan of structures were somehow retained till the end of Stage VI and also part of the walls were used during Stage VII for the construction of circular houses. Stone blocks from earlier structures were extensively



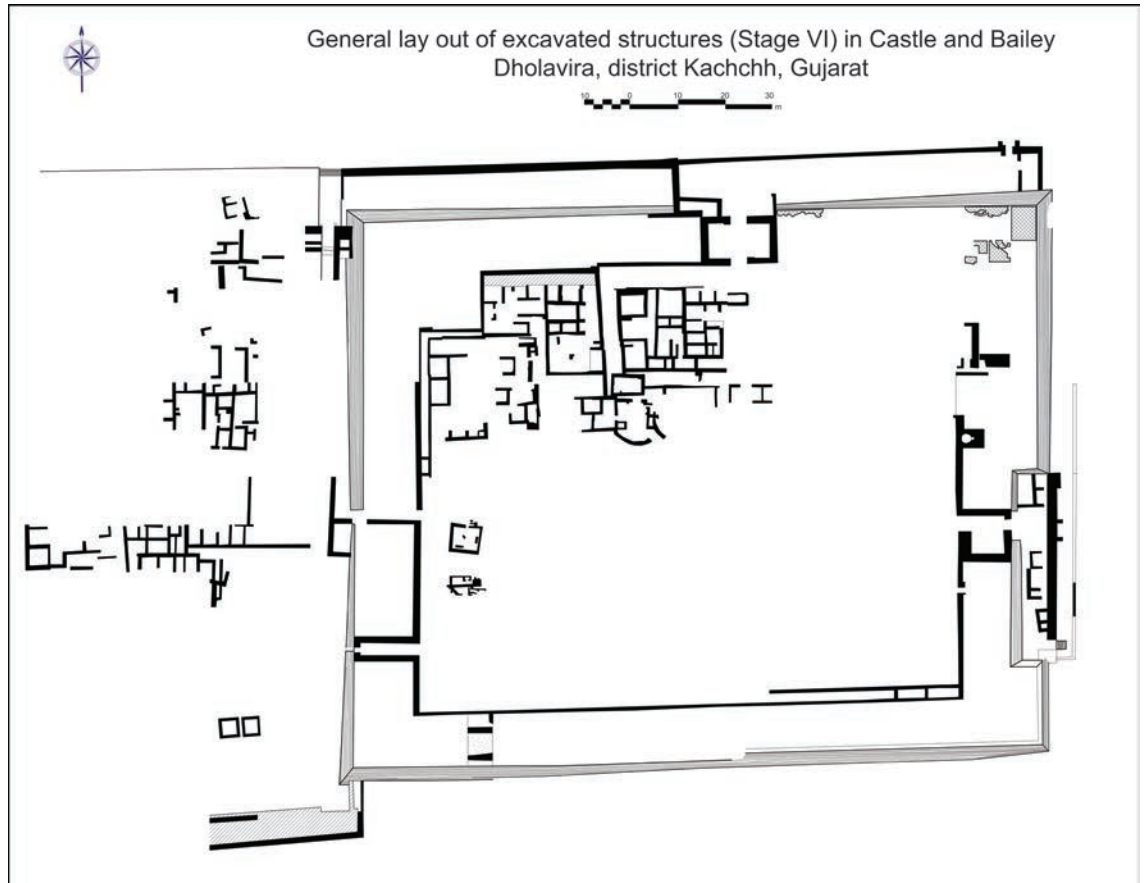


Fig. 2.12: Plan of structures of Stage VI, Castle

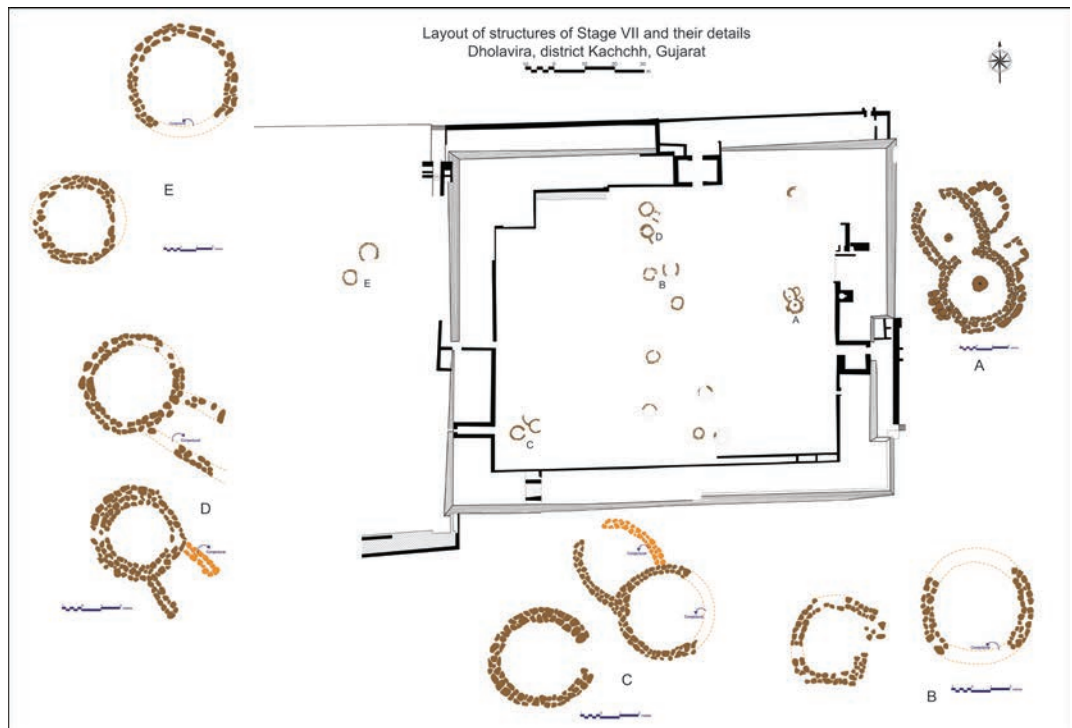


Fig. 2.13: Plan of structures of Stage VII, Castle

used by the inhabitants of Stage VI and VII. The circular structures of Stage VII could be noticed located on the roadway, indicating that the planning and layout was not in use anymore. The house plans of Stage VII consisted of single circle

as well as an elliptical antechamber, the similarities of which could be noticed in the existing house plans in the Khadir island and elsewhere in Kachchh.

2.A.vii.b Bailey

The western division of the acropolis is connected to the eastern division (castle) through an insignificant and plain gateway. The height of the occupational debris of bailey is almost half of the castle and it measures 123 m square, pierced with a gateway on the northeastern corner adjoining the western arm of castle. This bailey was enclosed on the north, west and south, while on the eastern side it shares the common wall of western fortification of castle. The southwestern and western parts of the bailey was left vacant, possibly for storing the drained water from storm water drain of castle and also for future expansions and the habitation was found only on the eastern half of bailey. The complete plan of house complexes of Stages IV and V of bailey could not be exposed due to the presence of habitations of Stage VI. A large house complex of Stage VI was exposed in front of the west gate of castle, consisting of at least twelve rooms, a few walls of which was used by the inhabitants of Stage VI. The evidence of bead working workshop was also exposed on the northern wall of bailey. The presence of circular house plans of Stage VII indicates that this area was also occupied during the last phase of habitation at Dholavira.

2.A.vii.c Middle Town

The ruins of the middle town are situated north of the citadel and west of the sprawling lower town and spreads over an area roughly measuring 340 m EW and 242 m NS (excluding Stadium internal) with a maximum rise of 8.5 m of occupational deposits. The ratio proportion of the measurement of said part of the city is 5:7. Like the citadel it too is found well-fortified and at the same time separated from the outer wall by wide vacant areas on north and west and from the citadel by another space. This division runs parallel to the Citadel and rather slightly out measures it in length both east and west. Within its walled area too, there are vacant spaces; a wide open area in west in addition to two open quadrangles each on north and south. From three sides, these quadrangular areas are closed in by built-up houses. The defenses are found duly provided with bastions and gates at frequent intervals.

The two third of the middle town was laid out with three bold projections and two recesses like the developed Indian temple ground plan having projection and recession on all four sides provided on either side of the arterial street running from east to west. Apart from this each bold projection units had minor projection and recess. In the middle town, there are seen two full and one half such units of which the slightly smaller one is in the western part, larger one in the middle and the half on the east where the last-mentioned one is bounded by the inner peripheral street that runs along the eastern defensive wall of the town. The width of the outer peripheral street is approx. 4.7 m.

Narrow gaps and passages gave evidence for sub streets and lane which quite



possibly ranges from 2.5 m to 0.75 m. Another significant feature is the arterial street that run across axially from west to east dividing all the above-mentioned units and sub-unit into two equal halves, and a north-south street, perhaps somewhat staggered, further subdivided each unit: Thus, rendering each unit having four built-up areas subdivided by streets. This kind of layout of the town helped carve out six open spaces in between the surrounding fortification walls and the built-up areas. The purpose of these open spaces is yet to be determined but it is likely that some part of these open spaces might be used as dumping ground or may be open areas for multiple purposes.

The southern margin of the town consists of a straight, continuous and rectangular built-up area running from one end to the other between the bounding fortification walls running along on the eastern and the western sides. This built-up area was also subdivided by a street into two equal halves along the east-west axis. The street pattern of the Middle town is somewhat more particular than the Lower Town. The width range of the E-W arterial street is from 4.35 to 5.30 m. on the other hand the N-S oriented street is somewhat staggered and their width ranges from 1.65 m to 2.55 m. The excavation also indicates the beginning of this part of this settlement from Stage III onwards, when the full configuration of the city was already been conceived, which reached its full form during Stage IIIB.

2.A.vii.d Lower Town

The Lower Town is situated on north-eastern side of the city and to the east of middle town. This part of city together with middle town and citadel forms an L-shaped design. Dimensions of the Lower Town is 300 meters E-W and 330 meters N-S excluding the outer fortification wall, so that the total ratio will becomes 10:11. The total length of the wall is 781 m (E-W), while total width is 630.50 m (N-S). The outer wall constructed during the time of Stage III and continued to be used till Stage IV, V and VI. The lower town doesn't have its own fortification, rather it is well within the outer fortification wall, eastern and northern city wall, while on the western side of lower town a similar peripheral wall running along eastern arm of middle town shared by both the divisions. Although it may more pertain to the middle town, possibly administratively. However, on southern side of the outer fortification it is faintly visible.

The general landscape of the site suggests that the city contours are spread in fans out like fashion. So far the maximum height in said area concerned is 7.5 m. The northern most limit of the lower town is exposed near the northern arm of outer fortification wall, wherein the limit and extent of N-S running street is also seen. Falls fully into the eight grids, it occupies nearly 1/3 area of the eastern half of the fortified city, which comprises grids from 13 to 16, 23 to 26, and parts of 2 to 6 (each grid measuring 100 X 100 m). Although it doesn't have its own fortification wall, It covers an area of about 1250 squares (10 X 10 m each) inclusive of the fortification wall and partly of the outside peripheral wall of northern and eastern side. It was demonstrated that the lower town came into existence during stage IIIB and survived through Stage V although some stray finds of Stage VI were found on the surface or sub-surface level.

2.A.viii Fortification

Ideally suited for a settlement, well provided with fortifications, built-up areas and artificial reservoirs, the site lies between the storm-channels and halfway down between the hills and the Rann. The site has a few rocky protuberances and ridges, surrounded by a thick pile of naturally deposited sediments. The fortification walls, both inner and outer, were structures of proportionately moulded mud-bricks, successive courses being laid in a recessed manner. As a result, both faces showed a marked taper with receding steps. While the outer faces were normally veneered with rubble and dressed stones, the inner ones were

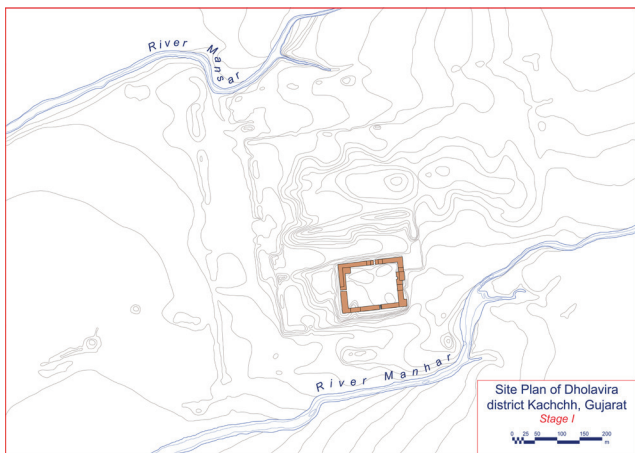


Fig. 2.14: Site plan during Stage I

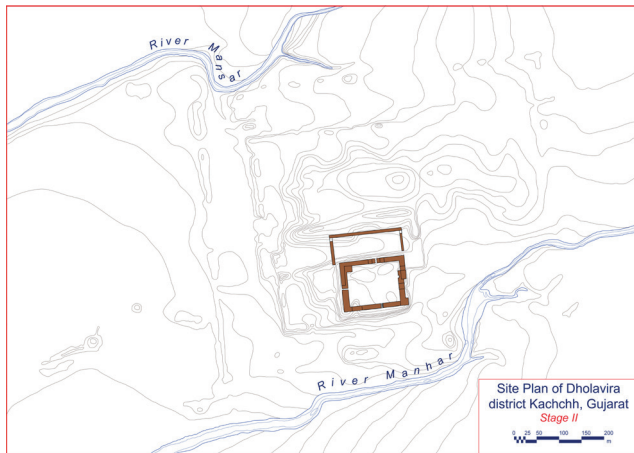


Fig. 2.15: Site plan during Stage II

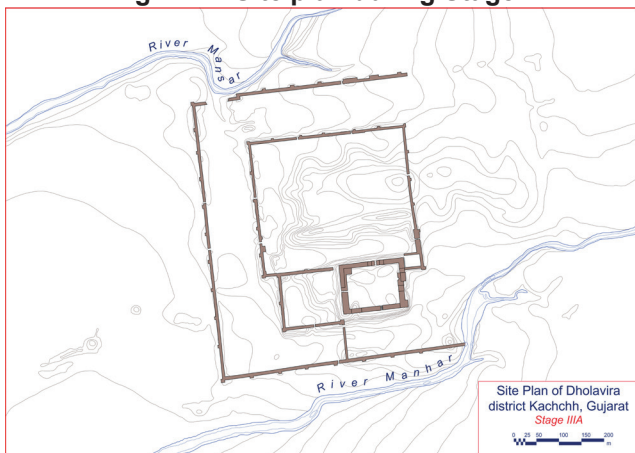


Fig. 2.16: Site plan during Stage IIIA

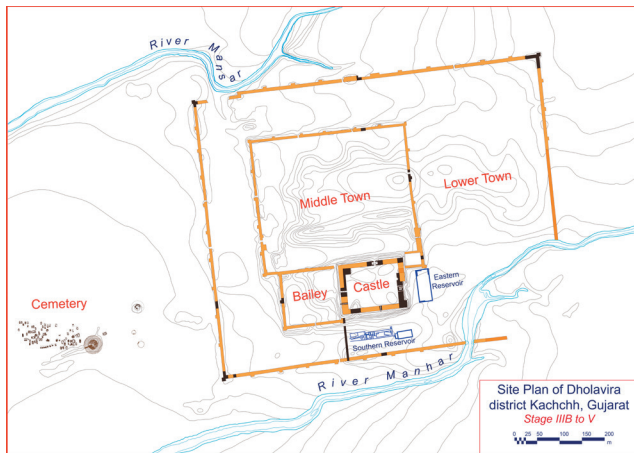


Fig. 2.17: Site plan during Stage IIIB to V

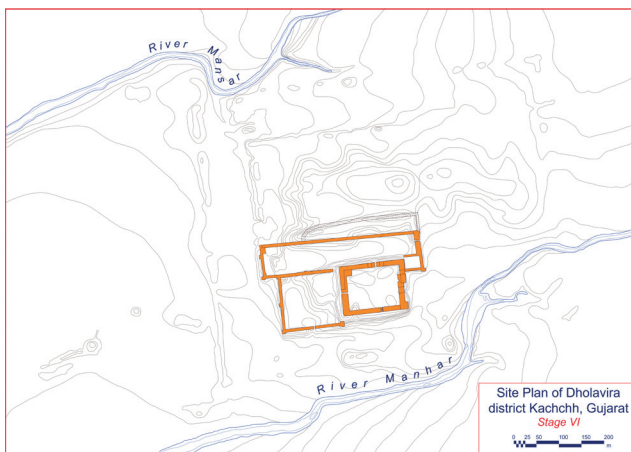


Fig. 2.18: Site plan during Stage VI



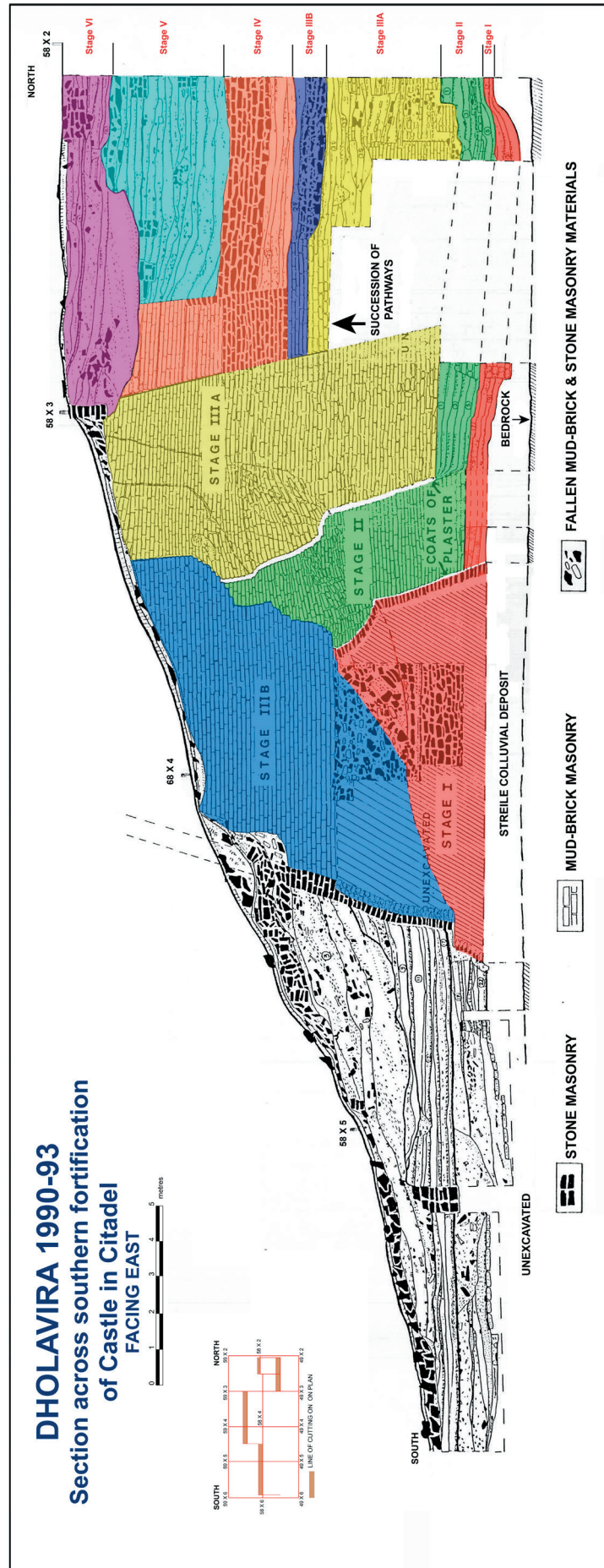


Fig. 2.19: Section across the southern fortification of the Castle in Citadel showing different phases of constructions

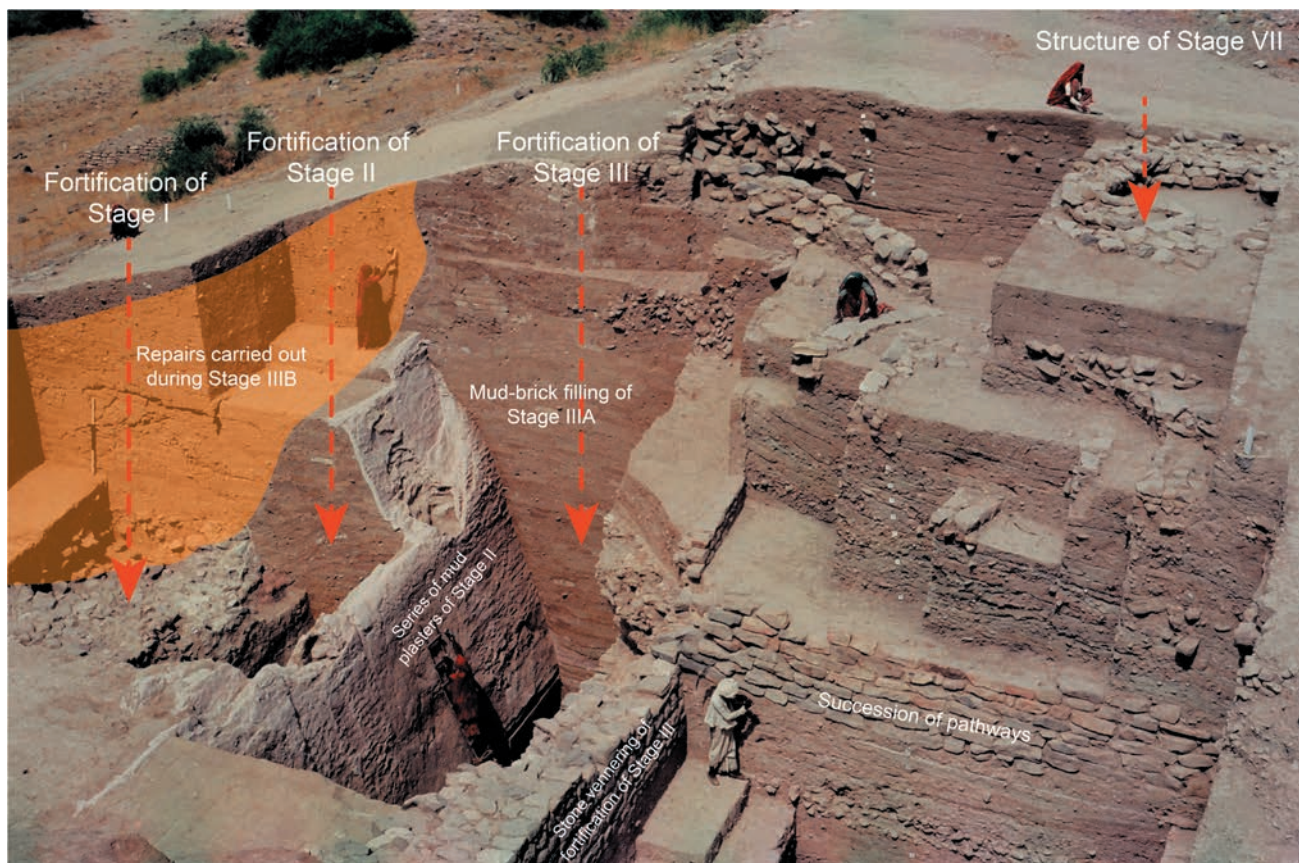


Fig. 2.20: Schematic representation of different phases of constructions of fortification of Castle in Citadel



Fig. 2.21: Excavation across the southern arm of fortification wall of Castle in Citadel





Fig. 2.22: Details of rain gully



Fig. 2.23: Details of mud-brick used in Stage II fortification



Fig. 2.24: Details of the excavation across the Rain Gully showing various phases of constructional activities of the fortification



Fig. 2.25: Addition to the fortification during Stage III



Fig. 2.26: Series of plaster surfaces on fortification of Stage II



Fig. 2.27: Details of the plaster surfaces of Stage II





Fig. 2.28: Details of the excavation across the fortification showing various stages of additions



Fig. 2.29: Details of the fallen portion of the southern fortification of Castle

periodically plastered over with fine clays. At vulnerable places or near the gates, the inner face too was provided with stone-facing.

Ideally suited for a settlement, well provided with fortifications, built-up areas and artificial reservoirs, the site lies between the storm-channels and halfway down between the hills and the Rann. The site has a few rocky protuberances and ridges, surrounded by a thick pile of naturally deposited sediments. The fortification walls, both inner and outer, were structures of proportionately moulded mud-bricks, successive courses being laid in a recessed manner. As a result, both faces showed a marked taper with receding steps. While the outer faces were normally veneered with rubble and hammer-dressed stones, the inner ones were periodically plastered over with fine clays. At vulnerable places or near the gates, the inner face too was provided with stone-facing.

The outer wall which was constructed in Stage III and remained in use throughout Stage IV and V and partly during Stage VI runs for a length of 781 m along the east-west axis on the north and 630.50 m along the north south on the west. The southern arm is traceable for a distance of about 600 m and the eastern one for 210 m with a vague indication for another 100 m. in the east, the ground being higher and more vulnerable to surface water and wind action, the eastern wall and half the northern wall had suffered considerably to the extent of being obliterated for stretches. In the south-eastern quarter, particularly across the Manhar nallah, the wall, if existed at all, is not traceable now. Another, interesting feature is the provision of projection bastion almost at regular intervals. Depending on the presence of vaguely to fairly observable remains there were provided, excluding the corner towers, 11 bastions along the northern and 9 ones along the



Fig. 2.30: Northwestern corner bastion of ourter fortification



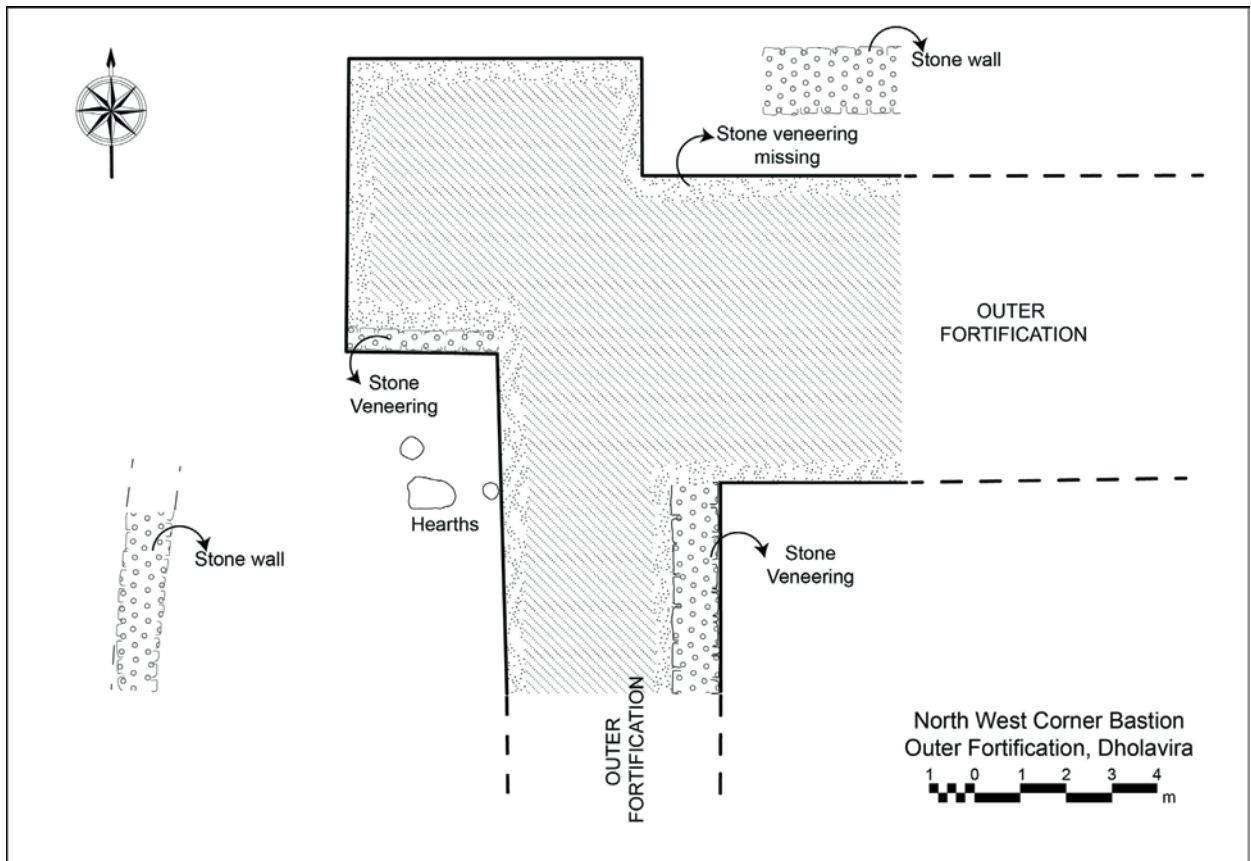


Fig. 2.31: Northwestern corner bastion of outer fortification



Fig. 2.32: Southwestern corner bastion of outer fortification

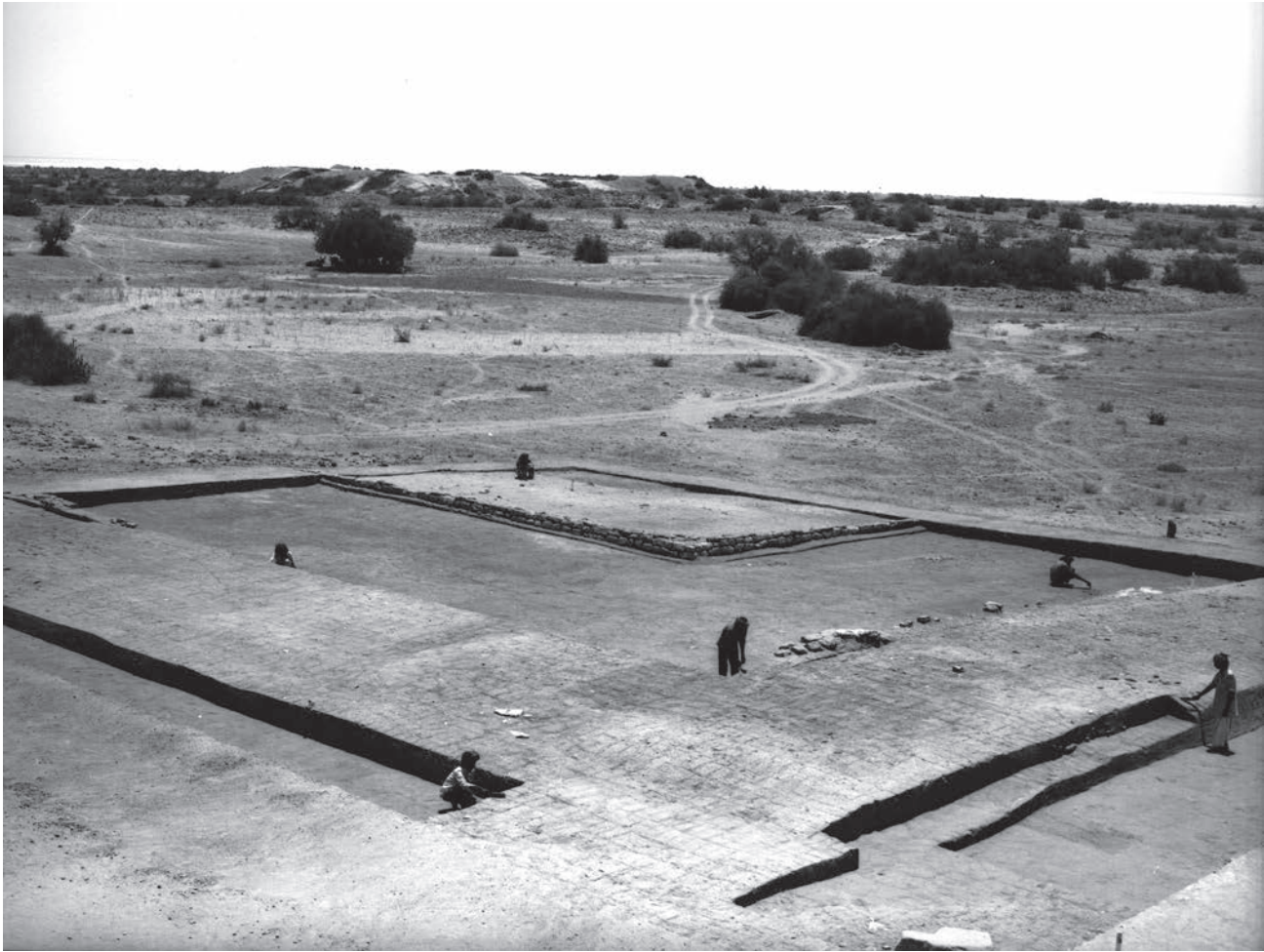


Fig. 2.33: Northeastern corner bastion of outer fortification

western arm of the city-wall, roughly at a distance of 50 to 52 m. Similarly, bastion can be seen along the extant segments of the other arms too.

Likewise, there were 5 bastions along the northern and 4 along the western arms of the middle town. Barring a smaller one in the south, no other gateways piercing through the outer walls has so far been exposed although there are certain prospective points. Of course, one gate provided in the east end of the middle town is laid bare while a few others are suspected in the other arms as well. In the castle, there was provided an impressive gate somewhere in the middle of each arm, although in the eastern wall a wide opening furnished with a flight of broad steps going down thickness of the defensive wall in addition to a regular gate. But, surprisingly, the steps in this gate under reference stopped on the outer edge of the wall and never descended onto the lower ground level on the east—thus rendering its function indeterminate.

The excavation across the rain gully in the Castle brought to light the complete history of the origin, growth, pinnacle and decline of the occupation at Dholavira. The habitation started in Stage I with a fortification having a width of 11.1 m and extant height of 4 m, the full configuration of which was excavated at the south-eastern corner of the Castle. The fortification was strengthened with an addition of a 2.80 m thick brick masonry wall to the pre-existing defensive wall from the inner side and the face of it was plastered over with fine paste of white and pink



clays at least as many as thirteen times. During Stage III, a further addition on the inner side having a width of 4.5 m was added and the city attained its fullest configuration. The settlement grew from a small fortress during Stage I and II to a full-blown city having multipartite settlements within it during Stage IIIB, which was maintained up to Stage V, i.e., Harappan period. The excavation across the rain gully in the south of castle also brought to light the nature of construction of the fortification at Dholavira, very much different from other large sites like Harappa and Mohenjo-daro. The predominance of baked bricks could be noticed at the latter sites, with filling of unbaked mud-bricks, while at Dholavira, the locally available materials like limestone and sandstone were used aplently, albeit with a filling of different coloured mud-brick in the core.

The differential colours of the mud-bricks used in the core have also been noticed in other settlements, in particular at Harappa also. The possible reasons for differential coloured bricks could be that the clay used in the manufacture came from different sources, thereby indicating the possibility of community participation for the manufacture of bricks using different sources, due to the large quantity of bricks to be used in the construction.

The cultural material associated with the construction of the fortification, corresponding to various construction levels could be associated with different stages identified at Dholavira, and thus a complete chronological history of the site based on the evidences obtained from the excavation across the rain gully could be understood. Further, the preference given to application of coats of plaster, possibly after a lapse of every few years, that too during Stages I and II and completely discarded later from Stage IV onwards, clearly indicates the norms and prescriptions followed by certain cultural groups and later discarded by the Harappans. The excavation also brought to light the evidence of a massive earthquake during Stage IIIA, which was attended immediately by the inhabitants.

The outer wall which was constructed in Stage III and remained in use throughout Stage IV and V and partly during Stage VI runs for a length of 781 m along the east-west axis on the north and 630.50 m along the north south on the west. The southern arm is traceable for a distance of about 600 m and the eastern one for 210 m with a vague indication for another 100 m. in the east, the ground being higher and more vulnerable to surface water and wind action, the eastern wall and half the northern wall had suffered considerably to the extent of being obliterated for stretches. In the south-eastern quarter, particularly across the Manhar *nallah*, the wall, if existed at all, is not traceable now. Another, interesting feature is the provision of projection bastion almost at regular intervals. Depending on the presence of vaguely to fairly observable remains there were provided, excluding the corner towers, 11 bastion along the northern and 9 ones along the western arm of the city-wall, roughly at a distance of 50 to 52 m. Similarly, bastions can be seen along the extant segments of the other arms too.

Likewise, there were 5 bastions along the northern and 4 along the western arms of the middle town. Barring a smaller one in the south, no other gateways piercing through the outer walls has so far been exposed although there are certain





Fig. 2.34: Central passage, East Gate



Fig. 2.35: Northern wall of Central Passage during excavation, East Gate



Fig. 2.36: Details of the bulged northern wall of central passage during excavation, East Gate





Fig. 2.37: Pillar members *in situ*, East Gate



Fig. 2.38: Pillar members *in situ*, East Gate



Fig. 2.39: Exposition of East Gate during excavation



Fig. 2.40: Details of the bulged northern wall of central passage during excavation, East Gate



Fig. 2.41: Bulged northern wall of central passage and pillar members *in situ*, East Gate



Fig. 2.42: Details of the central passage and chamber with pillar elements, East Gate



Fig. 2.43: Central passage, East Gate



Fig. 2.44: Details of the south chamber, East Gate





Fig. 2.45: Central Passage and the stairs leading to the upper levels, East Gate



Fig. 2.46: Central Passage and the stairs leading to the upper levels, East Gate



Fig. 2.47: Details of the southern chamber and pillars *in situ*, East Gate



Fig. 2.48: Details of the southern chamber and pillars *in situ*, East Gate



Fig. 2.49: Panoramic view of the East Gate and the terrace in front



Fig. 2.50: Panoramic view of the terrace of East Gate



Fig. 2.51: Present condition of East Gate



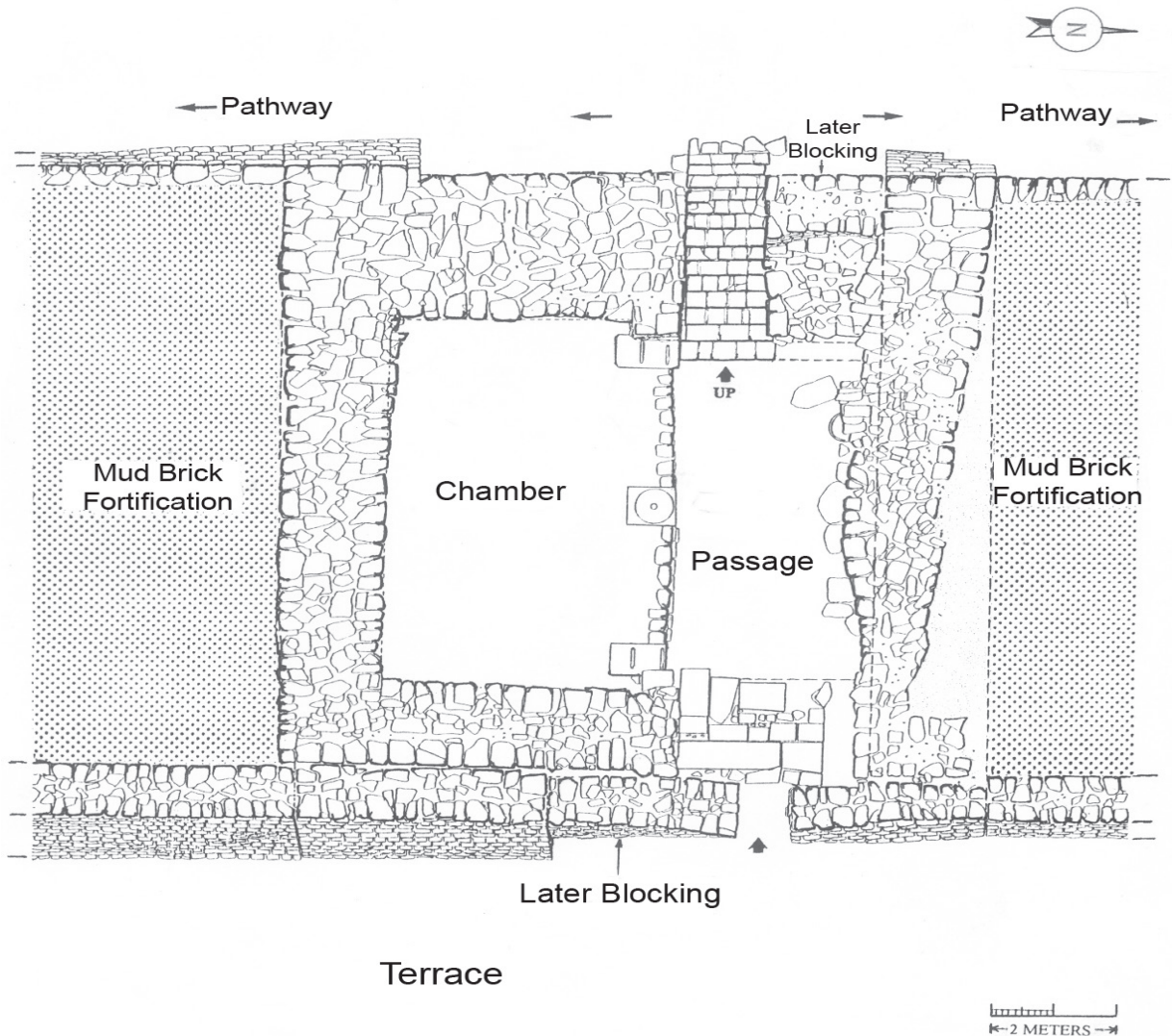


Fig. 2.52: Plan view of the East Gate

prospective points. Of course, one gate provided in the east end of the middle town is laid bare while a few others are suspected in the other arms as well. In the castle, there was provided an impressive gate somewhere in the middle of each arm, although in the eastern wall a wide opening furnished with a flight of broad steps going down thickness of the defensive wall in addition to a regular gate. But, surprisingly, the steps in this gate under reference stopped on the outer edge of the wall and never descended onto the lower ground level on the east—thus rendering its function indeterminate.

2.A.ix Gates

The hallmark feature of the fortifications at Dholavira is the construction of gateways, simple to elaborate in architecture, plan, building materials. These gateways could be noticed on the cardinal directions of the important divisions of the settlements like the Castle & Bailey of Citadel; Middle Town, Ceremonial ground and other places. The presence of gateways at other Harappan sites like Kalibangan, Mohenjo-daro, Harappa has been noticed from the previous exca-

Each flat surface of both the members also showed a similar hole for receiving a dowel. In front of the gate, there was exposed a high terrace raised between two massive flanking bastions. The provision for access made in the form of jerry-built set of steps at the southern side of terrace was a creation of Stage VI while the original approach seems to be lying still concealed under the late Harappan structures. It must be added that, during Stage V, a number of domestic/industrial buildings were raised on the terrace of the gate. The East Gate 2 is provided with a series of broad steps going down from the top but terminating higher up on the outer edge of the defensive wall without yielding any evidence of descending to the ground level on the east.

North Gate

The North Gate was found to be the most majestic, most elaborately designed architectural construction which commanded over the stadium, the middle town, the lower town and further beyond the picturesque landscape. In the thickness of the wall, it consisted of two elevated chambers flanking a sunken passageway which, in turn, was furnished at the inner end with a limestone door-sill flanked by a set of limestone blocks each bearing pilasters sockets on two sides – thereby suggesting the existence of two enormous columns (made of stone masonry) encased by wooden panels. The western chamber revealed evidence of pillage and disturbances due to the removal of the beautiful pillar members during Stage VI. The western chamber also revealed the presence of a large ten-lettered inscription, originally might have been inlaid on a large wooden board, the width of which corresponds to the width of the sunken passage of North Gate. This inscription, prepared of gypsum inlaid patterns could have been the earliest sign-board, probably displayed on the lintel of the sunken passageway of North Gate. At present this inscription is still *in situ* and not removed.

Those columns may have supported the heavy door frame fitted with two door leaves. A similar provision seems to have been made as well as the outer end of the passage ways evidenced by the door sill with a limestone block bearing sockets at one end, while the other one was replaced with ordinary blocks at a later time. As the east gate had marvellous bases of a central pillar and two pilasters on the elevated chambers of the north gate as well, although not found intact due to the vandalism wrought by the late Harappans of Stage VI. Similarly, there was a 12 m wide and approximately 33 m broad and 5.6 m high front terrace majestically overlooking the stadium.

On the east and along the high fortification wall, the terrace was connected with a 9 m wide 'ceremonial' pathway descending onto the stadium or 'ceremonial ground' through a gate wide as much. It was, however, reduced in width in Stage V or VI. At the inner end of the passage way of the north gate there was an L shaped staircase having 10 steps, a landing and then another flight of 13 steps turning at a right angle towards the west. Barring the southern one, the other three gates remained in use from Stage III to Stage VI although the last occupants neither maintained them well nor spared them from misuse.





Fig. 2.53: Exposition of North Gate, Castle during excavation



Fig. 2.54: View of North Gate and Terrace in front, Castle after excavation



Fig. 2.55: Panoramic view of the North Gate and Terrace, Castle



Fig. 2.56: 'L' Shaped staircase, Western Chamber of North Gate, Castle



Fig. 2.57: 'L' Shaped staircase, Western Chamber of North Gate, Castle



Fig. 2.58: 'L' Shaped staircase, Western Chamber of North Gate, Castle



Fig. 2.59: Details of 'L' Shaped staircase, Western Chamber of North Gate, Castle





Fig. 2.60: Eastern Chamber and out of plumb wall of North Gate, Castle



Fig. 2.61: Eastern Chamber and out of plumb wall of North Gate, Castle



Fig. 2.62: Sunken passage and door jamb of North Gate, Castle



Fig. 2.63: Sunken passage and door jamb of North Gate, Castle



Fig. 2.64: Sunken passage, Eastern and Western Chambers of North Gate, Castle



Fig. 2.65: Details of door jamb, North Gate, Castle



Fig. 2.66: Details of Eastern Chamber and pillar members *in situ*, North Gate, Castle



Fig. 2.67: Details of Western Chamber and pillar elements *in situ*, North Gate, Castle





Fig. 2.68: Pillar elements from different contexts and probable order of arrangements



Fig. 2.69: Panoramic view of the North Gate and Terrace, Castle



Fig. 2.70: Present view of the North Gate and Terrace, Castle



Fig. 2.71: View of North Gate, Bailey during excavation



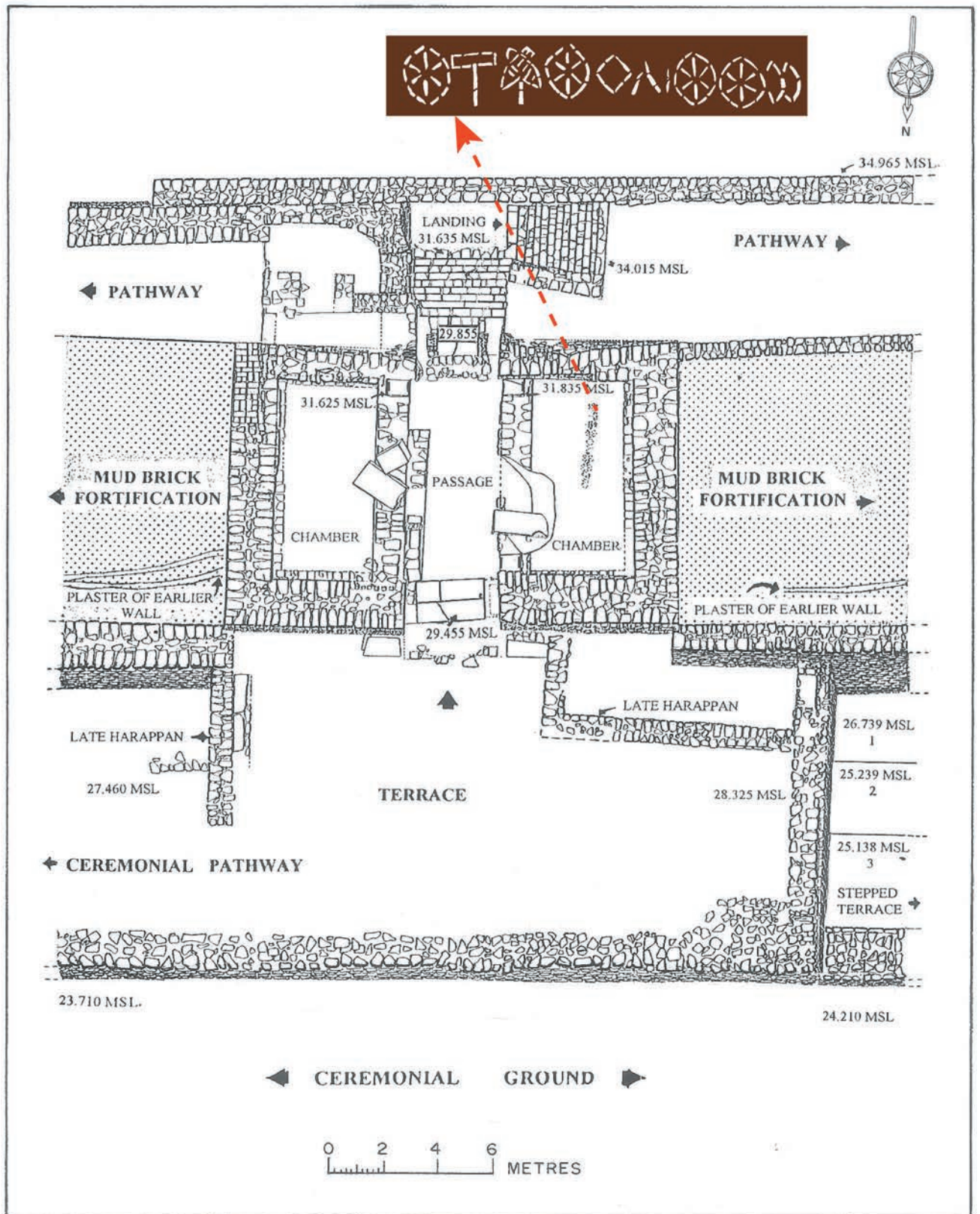


Fig. 2.72: Plan view of the North Gate, Castle



Fig. 2.73: North Gate of Bailey



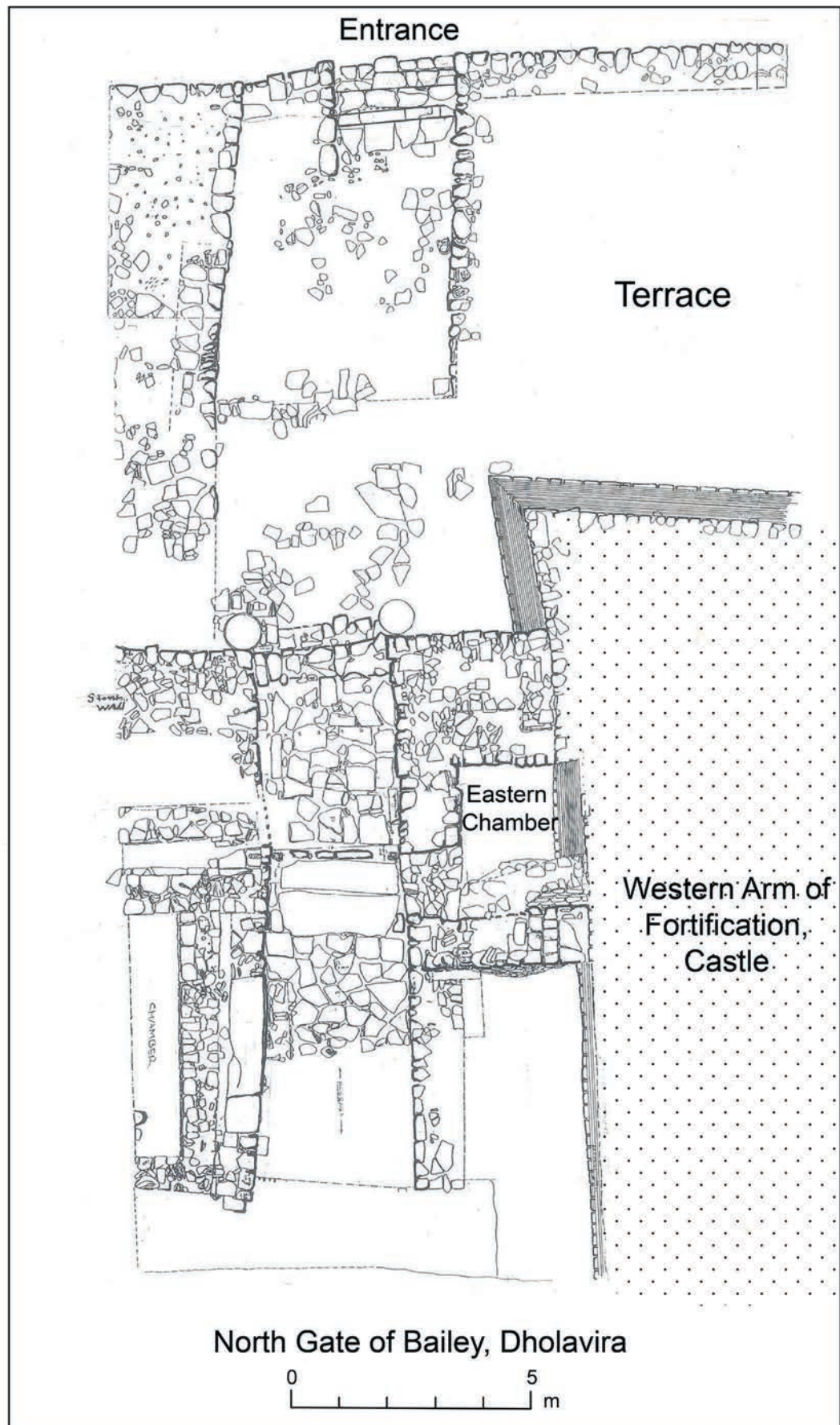


Fig. 2.74: Plan view of North Gate of Bailey



Fig. 2.75: East Gate of Ceremonial Ground during excavation



Fig. 2.76: East Gate of Ceremonial Ground during excavation





Fig. 2.77: East Gate of Middle Town, during excavation



Fig. 2.78: East Gate of Middle Town, after excavation



Fig. 2.79: Threshold of East Gate of Middle Town

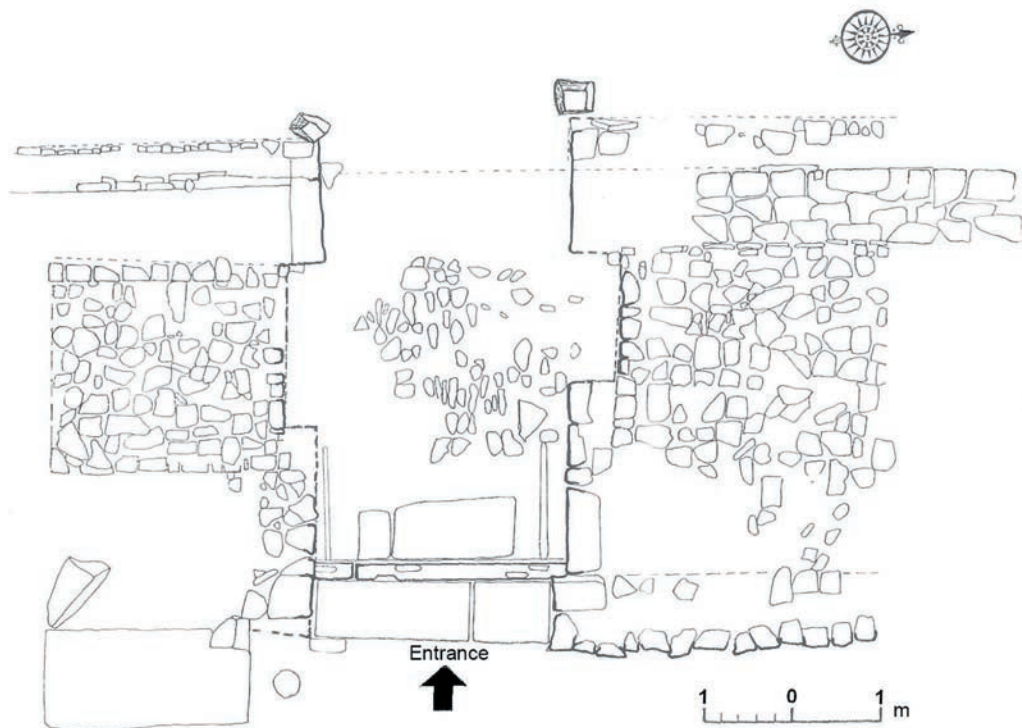


Fig. 2.80: Plan of East Gate, Middle Town



Fig. 2.81: East Gate of Ceremonial Ground during excavation



Fig. 2.82: South Gate of Middle Town, view from the Ceremonial Ground

ventions. However, due to the usage of stone architecture, combined with the polished limestone pillar elements, the gateways at Dholavira have been preserved in an extraordinary condition, even though evidences of pillage and destruction to them in antiquity has also been noticed. In particular, the North Gate and East Gate of Castle and North Gate of Bailey have been elaborately planned. Among all, the North Gate of Castle is the most elaborate, with evidence of two chambers on either side of the central passageway, and extensive usage of polished stone pillar elements, some of them have been preserved *in situ*. The preservation of these pillar elements *in situ* has helped in understanding their arrangement, the first of its kind from any of the Harappan settlements. Each gate from Dholavira is different and unique and differ from the other example, thus representing an



extraordinary array of elements of architectural features from Dholavira.

The Castle was found provided with five gates pierced through the fortification. Each one has revealed a distinct design. While the eastern arm has yielded two gates, there was one in each of the remaining three walls. The south gate has a concealed passageway with an ordinary doorway at its southern end where it was connected to a flight of wide steps descending to the northern embankment of the rock-cut reservoir. It was in use during Stage III but was sealed off something in the following stage of Stage V. The West gate which afforded intercommunication with the bailey was in the form of a 9 m long and 2.2 m wide passage way with a small guard room carved in the southern wall while the northern side was found washed away completely to the floor level of the passage. The sloping passage way has a few steps at the outer end which was provided with the steps made of large limestone slabs one of which may be seen as a plano-convex with rounded sides placed as the lowermost steps.

East Gate

The East Gate one of the two principal ones had a large chamber consisting of an elevated side-chamber on the south and a collateral sunken passageway on the North. The passageway was connected to a flight of 14 steps at the inner end while it was fitted with a door-sill made of large lime stones slabs at the outer one. At both the ends, it must be having huge doors. At either end on top of the side wall of the elevated side chambers, there was found a set of nicely cut and smoothened limestone block of rectangular shape. The topmost block bore two long sockets one each on two sides and parallel to each other. As evidence had it, each set of the blocks was the base for a pilaster, made of mud concrete bricks, and built to the ceiling of the gate chamber. Each pilaster was probably veneered with a wooden casting which was closed fit by a grooved and longed joint into the couple of sockets.

In the centre of the side wall was found another limestone block supporting a beautifully carved and polished pillar base having a pronounced concave profile and straight sided bottom and top surfaces were flat. The top surface bore in the centre a 5 mm circular hole. By the side of it, two large-sized pillar members with rounded sides and flattened top and bottom were found lying dislodged.

Other Gates

The **North Gate, Bailey** was constructed under the shadow of the towering north-western corner of the castle. A flight of steps gave access to 7.30 m long and 2.30 m to 2.55 m wide passage way which too was flanked by chambers. It facilitated intercommunication between the bailey and the stadium. The south bailey gate was likewise built under the shadow of the south western corner of the castle. Further details of the gate are yet to be collected by further excavation.

The **East Gate, Ceremonial Ground** was also an impressive construction with a guard room on the southern side and a sentry post set in the northern wall. The



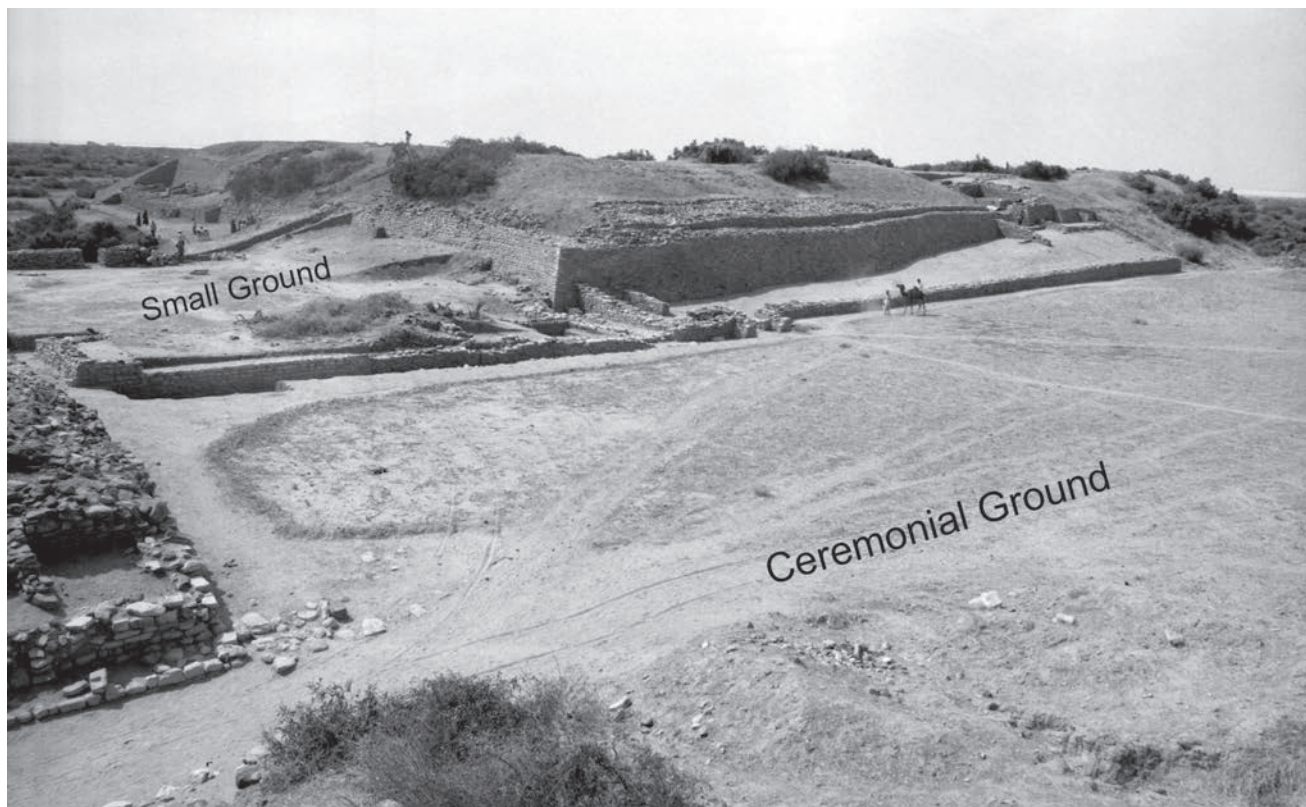


Fig. 2.83: Location of the Ceremonial and Small Grounds



Fig. 2.84: Lime plastered floor of Ceremonial Ground





Fig. 2.85: Location of the Ceremonial and Small Ground

passageway measured 12.20 m long and 3.80 m broad. The **west gate** as a simple opening was to provide movement between the two stadia. The **East Gate, Middle Town** was flanked by two bastions. Originally, it comprised two flanking chambers which got filled up with stones subsequently. At its outer end, there were fitted stone slabs across the width. Those slabs bore two set of grooves perhaps for receiving tongs of some sorts of wooden planks for closing the gate.

The **South Gate, Castle** through the city wall provided access to annexe and the rock cut reservoir towards the outside it, however, opened on to a large enwalled area attached to the city wall from the southern side. The subjoined area perhaps housed the state animal farm. Another gate in the annexe area was laid bare in the western bounding wall which lies N – S, joining the city wall with the citadel wall. Another gate not yet fully exposed stood to provide movement between the smaller stadium and the reservoir area lying to the east of the castle. The **East Gate 2 of Castle** is found further north of East Gate on the eastern arm of fortification, but only descending steps terminating high up on the fortification was exposed with no further evidence of descent to the east. The evidence for gate connecting the smaller stadium with the East Reservoir area was also found.

2.A.x Multipurpose Grounds

Identification of two multi-purpose grounds as integral elements of urban planning at Dholavira is yet another contribution of immense significance. **These grounds strongly appear to have been used as stadiums as well as seasonal trading areas in addition to miscellaneous social and other activities as observations made during excavations may throw light on.** If that be so, these should be the earliest and impressive features of the urban planning of the Harappans and will go a long way in interpreting anew the almost such open spaces found at other sites as well. It may be recalled that there exists an open space at Mohenjo-daro, at least as long as 400 m or even more, between the mounded areas

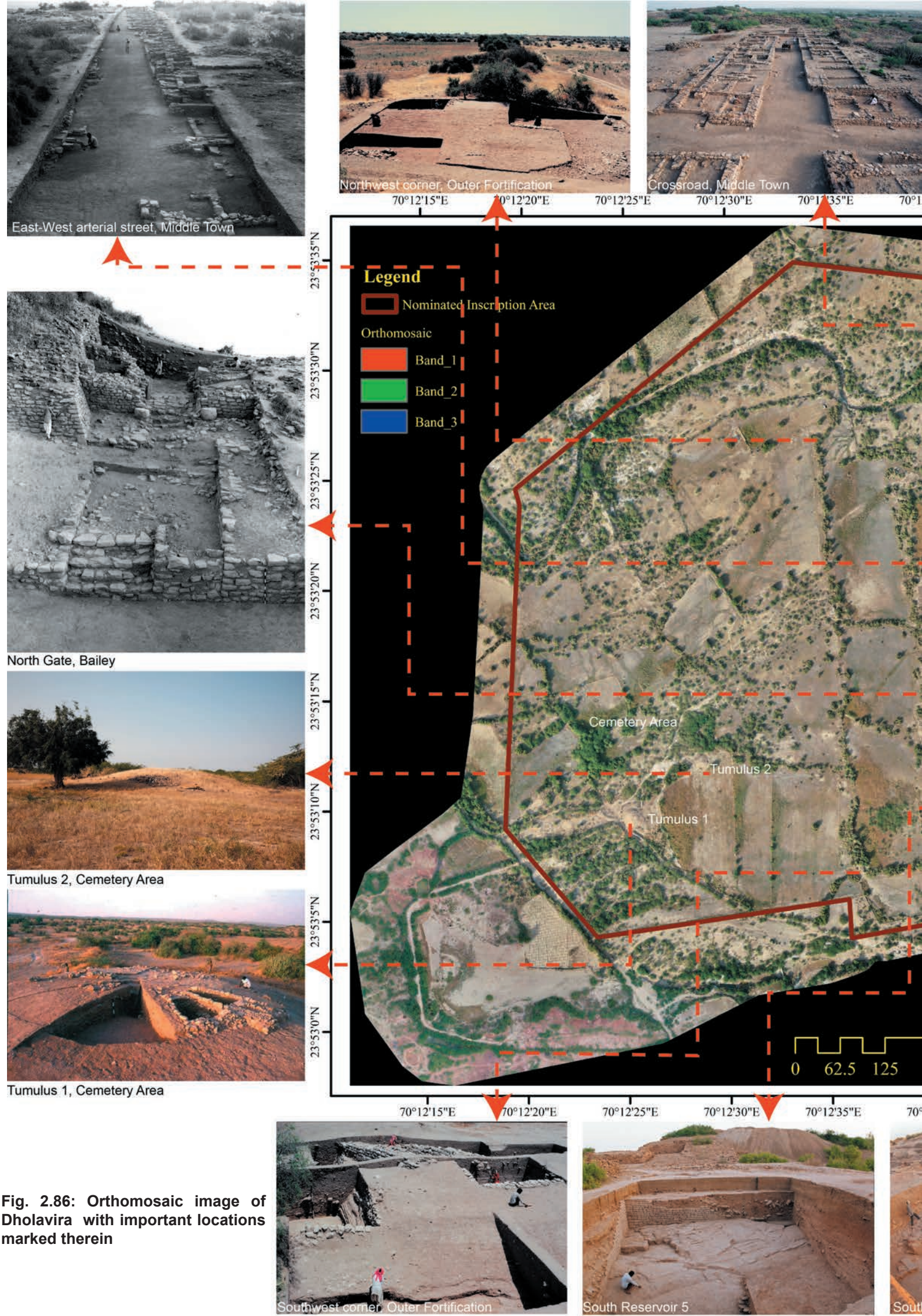


Fig. 2.86: Orthomosaic image of Dholavira with important locations marked therein



East Gate, Middle Town

70°12'40"E 70°12'45"E 70°12'50"E 70°12'55"E 70°13'0"E 70°13'5"E



Northeast corner, Outer Fortification



East Gate, Ceremonial Ground



North Gate, Castle



East Gate, Castle



East Reservoir



South Reservoir 4



South Reservoir 3



Dam across River Manhar

of the citadel and the lower town. Almost the same feature occurs at Kalibangan. At Harappa, there is a sprawling area to the east of citadel which incidentally falls to the north of mounds E and ET and, perhaps, bounded by another urban division on the north where the present village of the same name is perched on it. If properly investigated, it is presumed that all such open areas may reveal what Dholavira has represented as multi-purpose grounds which have been arbitrarily designated as great ground (GG) and little ground (LG).

The location of the GG between the citadel and the middle town, as already defined before is important. Equally important is the fact that it was strongly fortified and well provided with gates for providing access in to it from outside and also such gates which provide due inter-communication with each of the sub-division of the citadel on the one hand and middle town, lower town and little ground on the other. The very location as well as its being well defended and well-furnished demonstrates the importance of both the grounds. This stadium is possibly the largest and a unique find from a Harappan settlement.

The great ground, measuring 283 to 285 m E-W and 45 m to 47.50 m N-W, lies between the citadel and the middle town and is circumscribed by well-defined architecture. Along the south, there are three distinct segments: the first stretch in the east is the wall-cum-sitting terrace which separates it from the little ground; the second is the 80 m long ceremonial pathway ending on to the platform of the north gate; and the third one, supporting four or five stepped terraces runs partly along the citadel and the bailey. The entire length is punctuated by entry gates or openings giving access to the little ground, processional pathway and the bailey.

On the west there is a broad and long passageway running along the fortification wall of the bailey. To the north of it a small scale excavation revealed the presence of stands. The second and the third parts abut on to the northern fortification wall of the citadel inclusive of castle and the bailey. Almost on all sides, excepting the stretch of an 80 m appropriated by the north gate and the appurtenant ceremonial pathway, it was provided with stands for seating of spectators. The broadest one, 12 m wide, having three or four continuously running tiers or terraces, in ascending order, was made abutting the defensive walls of the castle and the bailey. Steps for seating have been noticed on the top of the defensive wall that stood to the east of the stadium.

A similar arrangement of steps is emerging at the west end too. The stand that lay along the middle town or on side of smaller stadium did not show the stepped construction due to perhaps the erosion of the centuries. The smaller stadium lay under the shadow of the preeminent castle. It was created in the area that was extending from the north-western corner and the east gate 2 of the castle. It was provided with two gates: one for inner communicating with the larger stadium and the other with the eastern outfield and the reservoir area lying extending to the east of the castle. As held before, **those stadia which were multi-purpose grounds perhaps are altogether new features of the Harappan planning as well as architecture, which is not noticed from elsewhere in any other Harappan city or town.**



2.A.xi Evidence for arrangement of streets

Arterial Streets

The excavation in the Lower Town area gave an idea of the arrangement and layout of streets, which is a general and important feature of city planning at Dholavira. The arterial street coming from the middle town through its east gate, albeit runs in general oriented E-W runs not straight but with a southward shift making an angle at four intervals and lastly joining a N-S running arterial street in the middle of Lower Town. The width of this street ranges from 4.2 to 4.5 m.

The width of another street running in a N-S direction ranges from 4.75 m to 5.05 m. Apart from this, there are other streets that may fall into the category of Arterial Street because of its width ranges from 5.2 to 5.8 m.

Sub Streets

These streets are generally less than 4 m in their width (approx. 3.15-3.50 m). Evidence of five such sub streets running north-south of varied width was found in Lower Town. A total 14 small streets were found in Lower Town of varied width, among them six streets were branched off from E-W Arterial Street and eight branches off from N-S, thus dividing the whole area into various housing blocks.

Lanes

These are the streets, which are generally located between various housing blocks and probably used as intra communication way between them. The width ranges from 1.2 m to 1.7 m (e.g. 1.2, 1.35, 1.65, and 1.7 m).

By lanes

These streets are generally less than 1 m in their total width and often observed for the purpose of inter communication between housing blocks. Two such by lanes have been found at the northern half of N-S oriented arterial street running E-W having width of 0.90 m.

The general construction of these streets indicates ramming of earth and no evidence of rut marks indicating no movement of vehicular traffic inside the Lower Town and also Middle Town. The evidence also indicates the encroachment of these streets after the decline of Harappan culture.

The arrangement of the arterial streets, sub-streets, lanes and by-lanes can be comparable with the other Harappan settlements like Harappa, Mohenjo-daro, Kalibangan, wherein the N-S and E-W streets cut at right angles. However, the staggered arrangement of streets in Lower Town is a unique feature at Dholavira. Thus, the **overall planning and layout of the street system follows similar Harappan settlements, yet attempts were noticed for unique features such as staggered arterial street in Lower Town.**





Fig. 2.87: Arterial Street of Middle Town (E-W running)



Fig. 2.88: N-S Street of Middle town



Fig. 2.89: Crossroad in Middle Town





wn

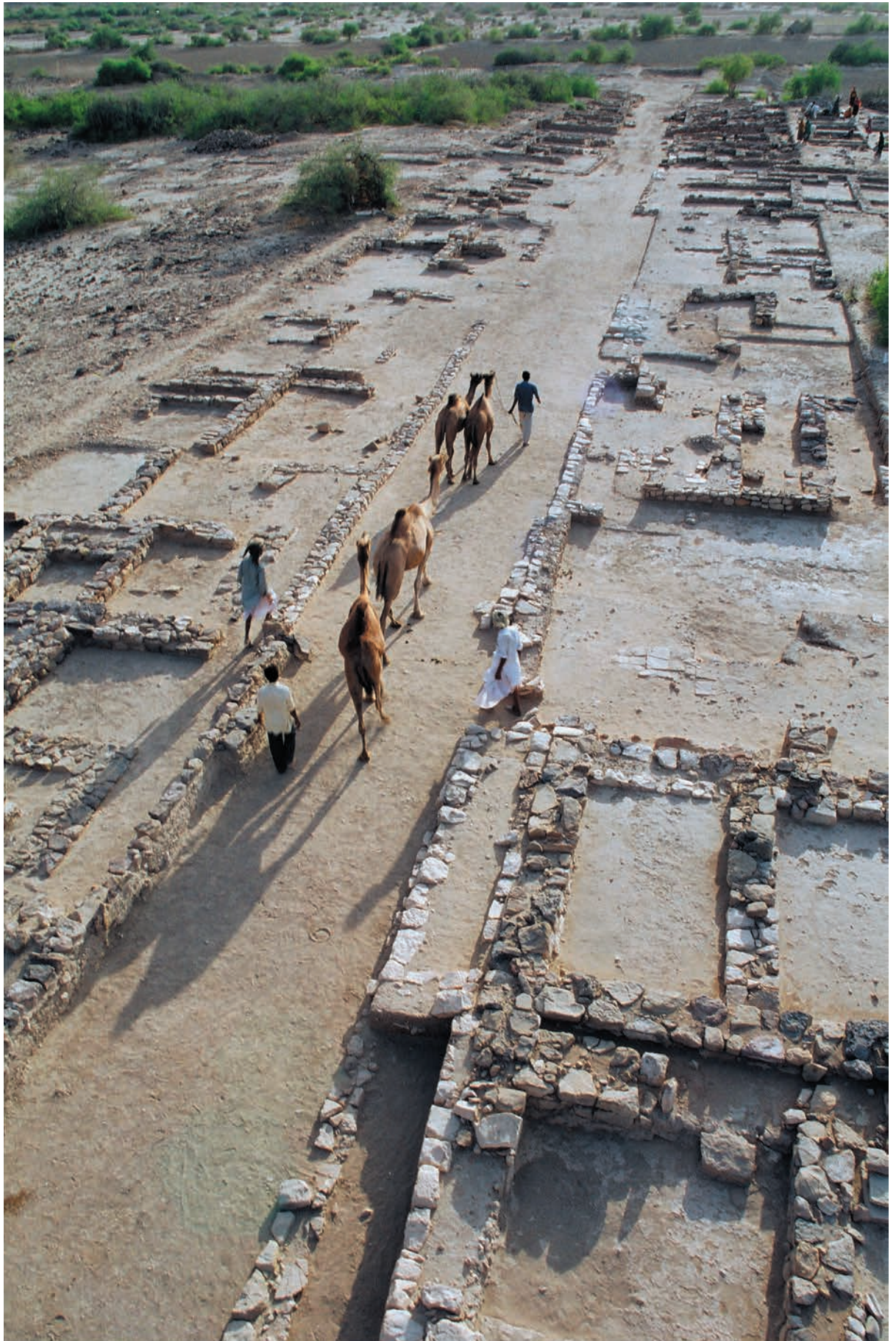


Fig. 2.90: Arterial Street of Lower Town



Fig. 2.91: House of Stage V, Middle Town



Fig. 2.92: House of Stage V, Middle Town



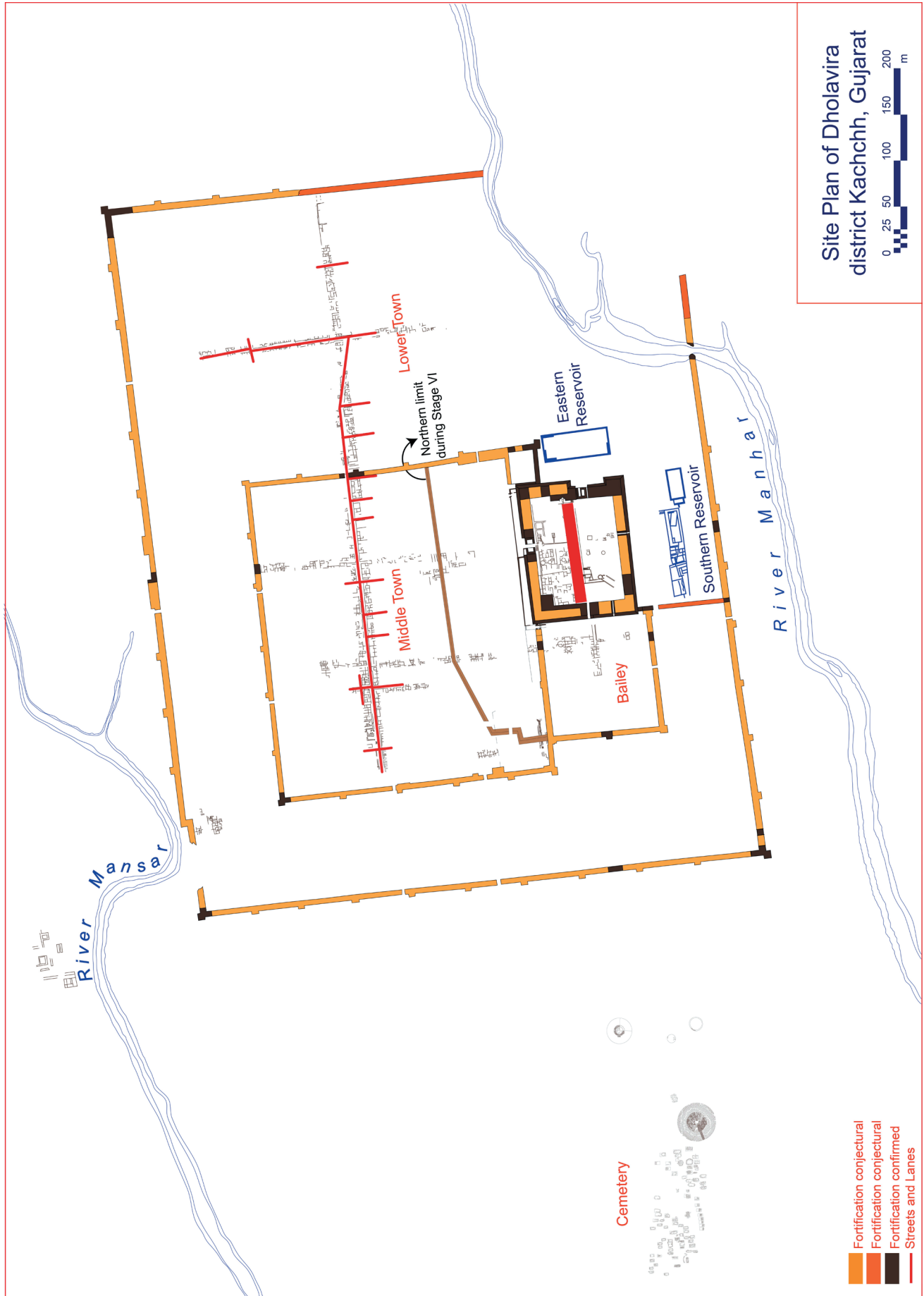


Fig. 2.93: Plan showing the arrangement of arterial and other streets

2.A.xii Water Structures

The south-western corner of the castle seems to have been reserved for water structures such as a large well, two water tanks, drains and some associated architectural features. The **well, perhaps the largest one found so far in the Harappan context**, has its internal diameter of 4.25 m in the north-south direction and 4 m along the east-west. The distortion is due to the lateral thrust from the direction of the east and the west. The original diameter may have, therefore, been 4.125 m. On the south-western face of the well a high degree of skill is manifest whereas on the other sides the gushing surface run-off during the period of desertion has caused much damage the stonework of the shaft. As a result, the stones of the face work particularly in the northern part have been rendered to be rounded off showing yawning gaps. The well has been evacuated to a depth of 13.60 m. For striking the water table another about ten meters of excavation may perhaps be necessary.

On the available evidence, it is almost certain that the well was certainly in existence during the Stage IV and had been used all through up to Stage VI. It is not unlikely that Stage VII people might have drawn water from it. Only full excavation can settle this issue as the strati-graphical context in the subsurface in the immediate vicinity have been found poorly preserved although, a little distance away, many a circular hut of the ultimate stage is duly present in well-preserved condition. So far the first phase of construction of the well is concerned; it can be ascertained by only deep digging down the exterior of the well shaft. Significantly, the basal slab of the trough bore rope marks. Besides, some slabs bearing deep rope marks due to their use for a longer period and thereby rendered unfit for further use have been found as discards in course of excavation. It is also interesting to record that there was found a pile of stones showing a fairly orderly collapse of a structure.

Even a cursory glance makes it obvious that it represents a masonry column by the side of the

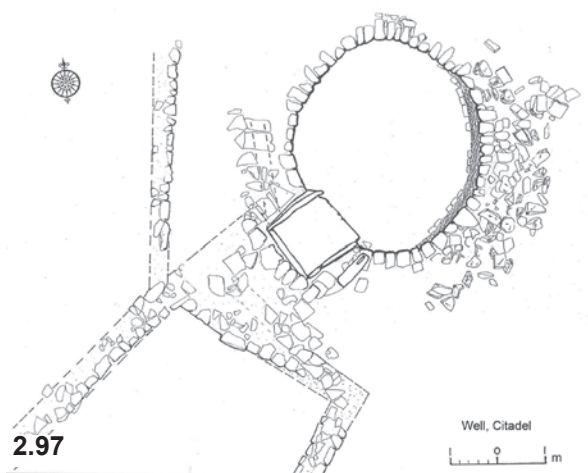


Fig. 2.94 - 2.96: Views of the well, Castle; Fig. 2.97: Plan of the well



well. On the opposite side on the west too, there is noticed another pile although far smaller in size clearly due to the reason that it had been robbed much of its stone columns to support a horizontal wooden bar running right above across the well. That bar must have been fitted with a wooden pulley for lowering a leather bag into the well for drawing water and letting it flow into the trough made of three stone slabs which is found on the south-eastern part of the well shaft. The available evidence has strongly indicated that a large leather bag having two mouths, one wide and the other narrow, each fitted with a thicker and a thinner rope respectively, was used for drawing the water with aid of the above-mentioned pulley, etc. A group of persons or a pair of animals must have been drafted for pulling the ropes tied to the leather bag for drawing water from the well. Through that made of three stone slabs – one for the base having an outward slant and the two slabs placed vertically along the sides of the first one. While the well-side of the trough is open-ended indeed, the opposite one is found blocked with a high masonry wall.

However, the south-western vertical slab has a small aperture that is connected to a covered drain that carried the water to two nearby water tanks.

Water Tanks

As stated earlier, there have been exposed two tanks fed by the water drawn from the well. The larger of the two lies 9 m to the north and the smaller one 13.20 m to the north-east. Lying 4.70 m apart and placed parallel to each other, both are connected to a broad-way through their respective stairways. Internally, it measures 4.65 m north-south 70 cm wide, enclose the tank. The stairway having six steps measures 2.25 m north-south and 2.50 m east-west. The steps having a span of 1 m and tread of 40 to 50 cm and riser from 20 to 40 cm, descend from the broad-way on the north (the 13 m wide broad-way running east-west divides the castle into two unequal halves). These steps have different phases of construction following the periodical rise in the levels of the broad-way over the Stages. Significantly, the stairs of the larger tank descend only halfway down and terminate 1.90 m above the floor of the tank. In the south-eastern corner, there is a spout projecting from the mouth of the drain that is connected to the well as stated above.

The maximum extant, may be the maximum original, height of the partly damaged walls of the tank is 3.80 m. The lower margin all around the tank is lined with limestone slabs, which measures large 60 to 70 cm wide and 1.20 to 1.30 m high. The slabs are joined together with fine, sticky and impervious clay. Above it there is found the rubble masonry of poor workmanship, which was raised from time to time due to the rise of the surrounding area.

In the centre of the tank, there is built a miniature tank having length, width and depth of 80 cm each. On the floor, there are deep use marks which can be caused only when one descends in the tank and makes use of the floor for grinding, polishing or pounding something. How and when that was done remains inexplicable. Some of the steps too bear circular depressions which are normally caused

by placing water jars at a spot over a long period of time. Coming to the smaller tank we find that its internal measurements are: 2.20 m north-south; 2.30 m east-west; 4.85 m deep; and the staircase being 5.30 m long north-south and 2.45 m wide. The staircase has 14 steps descending from the broad-way towards the south. Like that of the larger one, the span of the steps is one meter. Importantly, the stairs are far gentler and built much better with an average tread of 30 cm. For stepping into the tank, a cylindrical limestone block is found placed on the floor near the stairway. It not only facilitated an easy descent but may have been also used as a seat by the user. It is believed that this could be a bathing tank. Anyway, it is interesting to note that a cylindrical block conceals an aperture of the smaller tank at the centre, which may have been connected to a drain for flushing out the used water.

The limestone slabs used for lining are



Fig. 2.98: Water Tank 1 (Larger), Castle



Fig. 2.99: Water Tanks and Well, Castle





Fig. 2.100: Water Tanks and Well, Castle



Fig. 2.101: Water Tank 1 (larger), Castle

smaller in height as well as width. However, the inlet channel showing a usually wide mouth, like that of the larger one, is in the south-western corner. Floor paving is also of superior workmanship. A similar hole has been observed in the larger tank as well. In both the cases, there should be their respective drains connected to a sump or to the main drain that runs underground beneath the broadway. Looking at both the tanks it is certain that the larger one was for the storage of water and the other could have been a bathing tank. Most significantly, this water tank was found associated with symbolic evidence. A water jar, elegantly

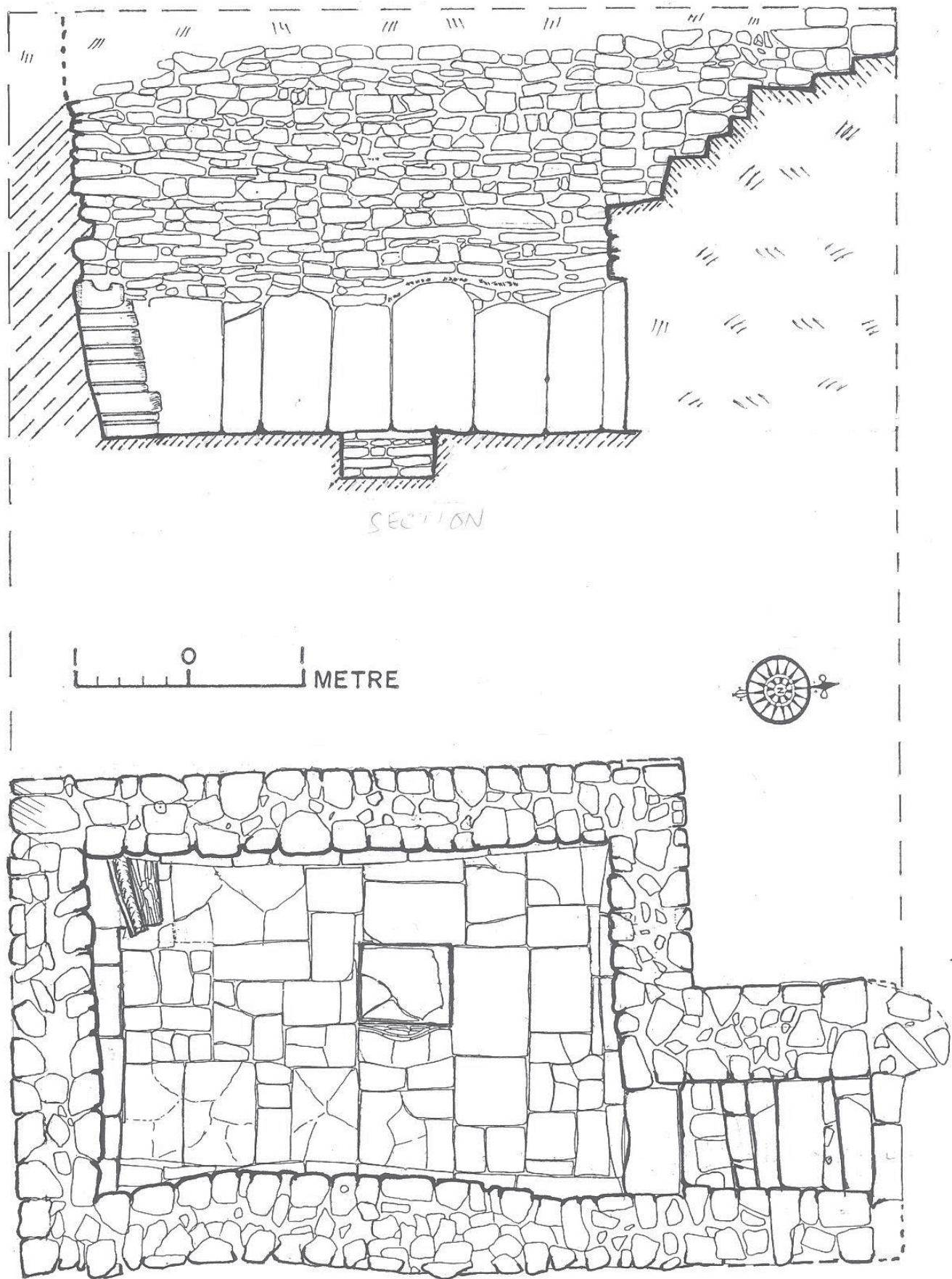


Fig. 2.102: Plan and Elevation of Water Tank 1 (larger), Castle



Fig. 2.103: Water Tank 2 (smaller), Castle

decorated with simple geometrical motifs in the Jhukar style (Fig. 2.175), was found placed empty and upside down, with a stone lid on its mouth, near the top landing of the staircase of the tank by the late Harappans at the time of desertion of the town of Dholavira. One well and two water tanks, which together make an integrated complex, have set an example of a kind. All those are located in the south-western quarter of the castle. On the north, it was bounded by the broadway, on the south and west by the fortification and on the east, perhaps by the residential houses which yet remain to be probed.

All those water structures, as they were found, and so far probed, were in use during Stages IV, V and VI. Further digging in this area may reveal a few more interesting features. Already, traces of some fire-places perhaps used for beating water have been observed. Besides, some small cubicle-like constructions which were once fitted with stone slabs were seen in the area lying between the well and the tank. Those could be bathrooms. In the foregoing account, it is attempted to recount the cultural progression, the highlights of planning and the freshly discovered system of water harvesting. Each one has added a new facet to the personality of the Harappa culture. It may be well rounded off by recapitulating about the gates and the stadia which too are marvels of planning and architecture.



Fig. 2.104: Location of check dam across River Manhar at the southeastern corner of city



Fig. 2.105: Location of check dam across River Manhar at the southeastern corner of city



Fig. 2.106: Location of check dam across River Manhar at the southeastern corner of city

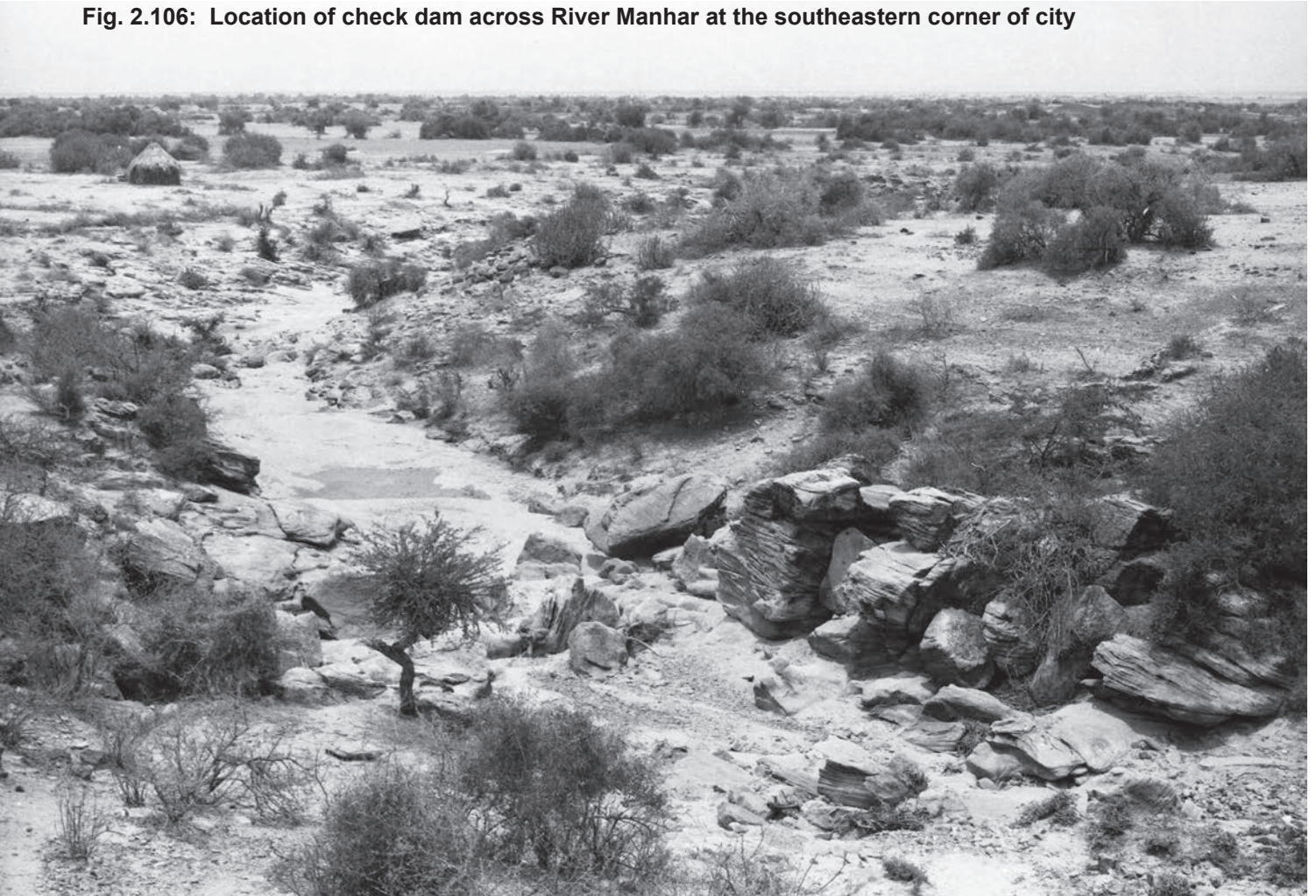


Fig. 2.107: Location of check dam across River Manhar at the southeastern corner of city

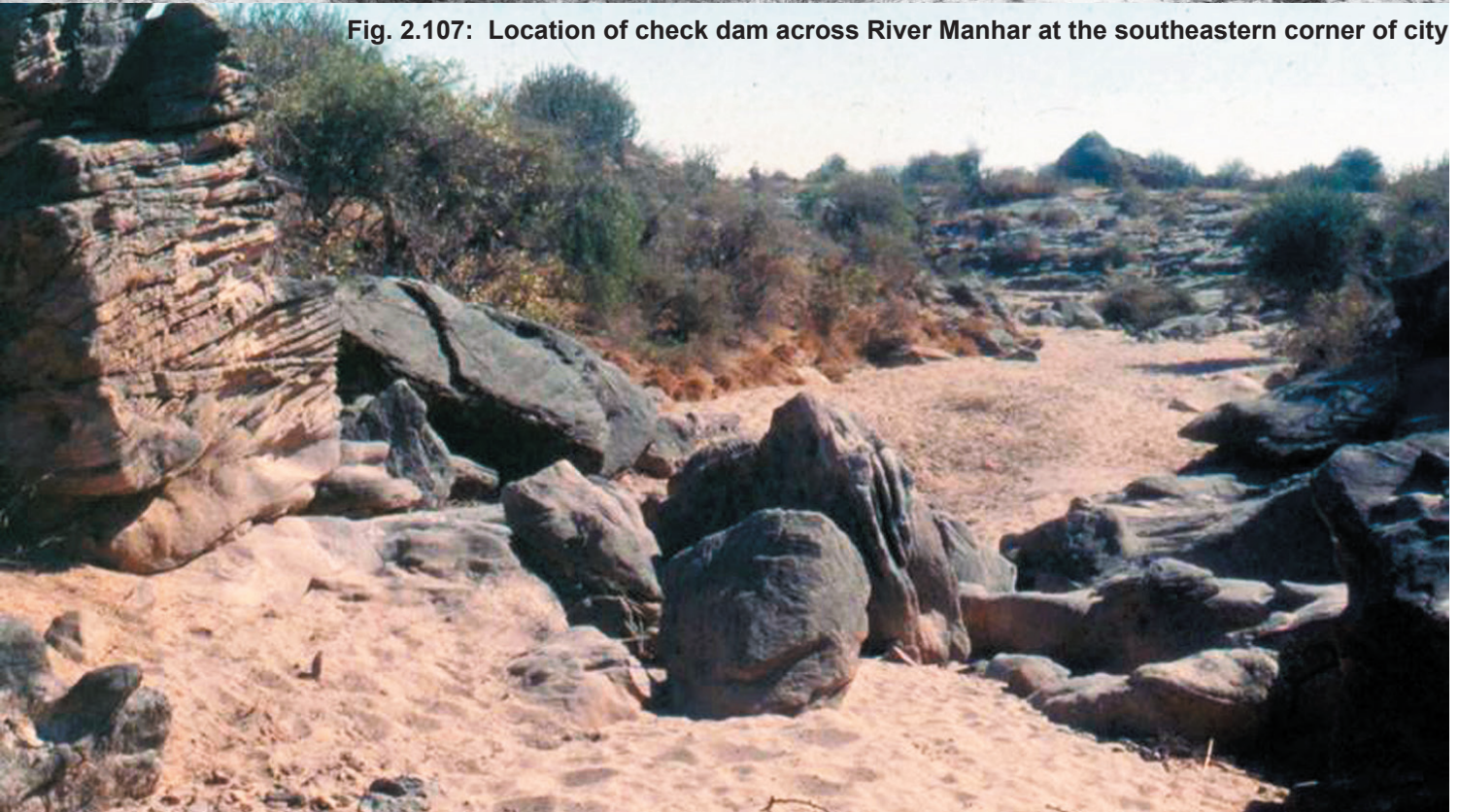




Fig. 2.108: Rainwater in River Manhar during monsoon



2.A.xiii Dams and Reservoirs

Dams

The kind of **efficient system** that the **Harappans of Dholavira** developed for utmost conservation, harvesting and storage of water speaks eloquently for their advanced hydraulic engineering given the **state of technology** in the third millennium BCE. This concern for water also tells for the contemporary environment which may not have been glaringly different from what prevails now. Water must have been a precious commodity at that time, as it is even now. Seated on the margin of the monsoon belt, Kachchh experiences poor, often erratic summer precipitation. Failure of monsoon, sometimes for consecutive years, is quite a phenomenon. There are no perennial rivers, lakes or springs. The ground water is, by and large, brackish and saline and unfit for human and animal consumption and even for cultivation largely. The winter rainfall is almost absent. Therefore, droughts are frequent and so are famines. On the whole, the environment is harsh and hostile to human existence. In such a ride Kachchh, the Khadir Island where Dholavira lies is the second poorest in rainfall which only averages to 262 mm per annum.

A good deal of forethought must have gone into selecting the site even for the first settlement. The early Harappan chose a higher ground by the side of the Manhar, one can see that an (or rather the) inundation channel, if not the main channel it-



Fig. 2.109: East Reservoir during excavation



self, was flowing in the east and then running along the south of the site of the first settlement. The first settlers who had developed expertise in Baluchistan and Sindh Kohistan before coming to Kachchh may have successfully dammed the Manhar and deepened its bed by cutting the basal rock in order to carve out a large reservoir spreading over in the east as well as the south of their fortress. Perhaps, the aberrantly cut deep tank, a lower part of what can be seen inside the subsequent rock-cut reservoir to the south of the castle, if the remnant of the first experiment. Surely, the selection of such a site beside a smaller torrent having potential of being tamed was a well-considered decision.

Otherwise, there were existing many a deeper and broader channel having voluminous flood regime but those were certainly too difficult for harvesting water as the builders did not possess the knowledge of raising durable dams for want of dependable cementing material. This choice of site naturally suited well to all the successive Harappans who gradually developed it into a town and then a city. Given a sloping nature of a wider ingeniously encompassed all the principal divisions of the expanded settlement. In order to harvest more water, they reached out to the Man-sar which too was dammed for



Fig. 2.110: East Reservoir during excavation

filling the reservoirs.



Fig. 2.111: Northwestern and northeastern staircases, East Reservoir



Fig. 2.112: East Reservoir, view from southwest



Fig. 2.113: Stepwell inside the East Reservoir



Fig. 2.114: Stepwell during excavation, East Reservoir

Fig. 2.115: Stepwell during excavation, East Reservoir

Elevation of Eastern Arm, East Reservoir

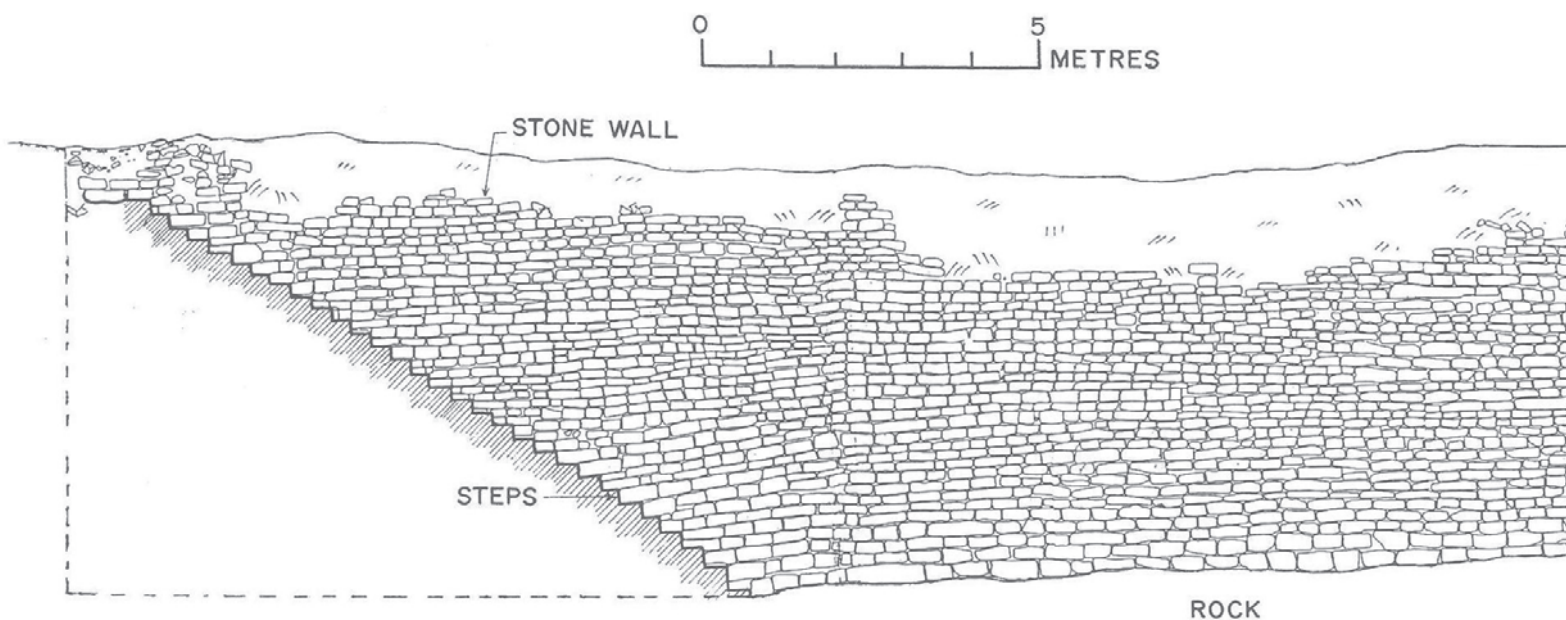


Fig. 2.116: Elevation of eastern arm of East Reservoir

In fact, the Manhar has evidenced for three and the Mansar for two places where the dams were raised across their channels. At the prospective site of the lowermost dam, thrown across the Manhar, there were exposed lower remnants of several closely adjoining parallel walls in the river-bed by simply removing the sand accumulated over them. Nearby and further down-stream, a scatter of huge stone blocks of different geological formations other than those found in the vicinity may be seen lying helter-skelter in the bed. Those blocks, some of them cut to size, are too heavy for being transported over distance by the flood waters of the channel.

Similar situation prevails at the other dam sites too. Close to the lowermost dam site across the Manhar, an enormous bounding wall with a neatly plastered face and having an inlet channel higher up for letting surplus of the dammed-up water into the southern series of the reservoirs was laid bare. The deposit accumulated on the other side of the inlet channel vividly showed the angle and depth of fall as well as the force of water.

Thus, the damming at Dholavira of the streams exhibit the extraordinary ingenuity and understanding of the environment to meet the needs of the sprawling city, which is unique among the contemporary settlements.

Reservoirs

The Harappans during their heyday created within the city walls in all sixteen for more reservoirs of varying sizes and arranged them, along the northern, western and largely the southern sides of the main settlement and the east of the citadel, which were also excavated. The exact configuration of the reservoirs on the northern and western sides are still unknown, but the surface indications show the utilization of this area for storing water.

A gradient of 13 m between the higher north-east and the lower southwest was ideally suited in selected tanks instead of letting it spread out over larger area as a thin sheet which should be highly susceptible to quick evaporation and seepage. Many of the reservoirs might not be meant for storing water all the year round as they were carved out by removing the top soil down to the bed-rock which does not behave evenly nor lies adequately deep all over. Possibly, to get all the reservoirs filled with repairs to private houses and public structures as soon as the rainy season was over; secondly for the irrigating summer crop; and if not the least, to enrich the ground water reserve.

In the whole scheme, the city walls, particularly on the west and its adjoining quarters, played a crucial role. Apart from providing formidable protection to the city, they functioned as strong bunds made of millions of moulded mud-bricks carefully laid in mud mortar. The inner peripheral road lined with stone masonry saved the walls from the water scoring as well. A tentative estimate indicates that the reservoirs account for about 10 hectares, working out approximately to 10% of the total area covered under the city. Our earlier view that the north-eastern quarter across the Manhar housed a large reservoir was not substantiated by the

Reservoir





Fig. 2.117: South Reservoir 3 during excavation



sporadic digs that were made there.

The excavations have brought to light to excellent examples of reservoirs.

The **east reservoir is the largest, grandest and best-furnished one in the series that Dholavira has yielded so far.** It was carved out under the shadow of the imposing castle that stands 20 to 22 m in west while it is bounded by the little stadium on the north. Now, all of its four corners stand duly ascertained and fully exposed. All the four walls of the basin bear outward slope from the bottom upward. Running north-south, parallel to the eastern arm of the castle wall, the longer axis of the reservoir measuring 73.40 m to 73.50 m at the extant top and approximately 70 m at the bottom and the width at the top and the bottom are 29.30 m and 27.70 m to 27.75 m respectively, while the general depth does 7.50 m to 7.20 m from the mean surface level of the modern cultivated field. Perhaps, the height of the stone-made side wall of the reservoir should have been 7 m to 7.50 m including the 1.00 m to 1.20 m high embankment made of rubble. The ratio in respect of depth, width and length works out to 1:4:10, while that between the length and the width, whether upper of lower, is 2:5. In other words, the length was two-and-half times the width and the depth was 1/10th of the length, in other words it was 1/4th of the width. It is significant to note that the maximum depth that was obtained by cutting the rock has measured to be 10.60 m in the northern part of the reservoir where probing is done limitedly. Not unlikely that the greater part of the reservoir in its central zone was deepened to the said depth of 10.60 m while the margins along all four sides were kept higher having two levels. In its present form the reservoir may be a creation of Stage IV itself.



Fig. 2.118: South Reservoir excavation

There are, however, indications that the earlier ones, albeit of lesser pretensions in terms of size, shape and depth may have been there perhaps all the time right from the beginning of the first settlement itself. There was surely one during Stage III. Among the other components of the east reservoir, the most significant ones are: the three flights of steps; a rock cut well within a walled enclosure; the smaller and deeper basin cut out of the rock; some other enigmatic and minor features which may have been introduced at different points of time for some special short-lived uses. In the cultivated fields lying between the castle on the north and the annexe and the city wall on the south, **there were buried a series**



of five reservoirs, which could have remain unknown without the aid of the excavations.. These are of varying sizes and orientations excavated into the soft sedimentary formation of sandy limestone. The reservoirs were not arranged in a straight line precisely. Their disposition is rather staggered and can be divided into three sub-units: The first two reservoirs from the east are designated as South reservoirs 1 and 2 (SR-1 and SR-2 in abbreviated forms respectively), the third one consisting of another two reservoirs in the west SR-4 and SR-5 and the second subunit, i.e., SR-3 occupies the central location between the two subunits and was the first to come to light, and, also, perhaps to have been excavated first among the southern ones.

The first reservoir internally measures 30.35 m E-W and 13.90 m N-S with a depth varying in general from 3.90 to 4.20 m while the second is 9.60 m N-W and 4.45 m E-W.

The **third one which is centrally located is primarily a rock-cut architecture of excellence, exquisite beauty and superb skill.** The excavation has revealed that it consisted of some underground features and some over ground appurtenances. Among the former, there are: a deep basin, a deeper trough, a free-board, two masonry flights of steps and a covered rock cut outlet channel. In the later category there are: an enclosure wall and an outlying working platform, a massive levee with inlet drains, and a passageway flanked by walls, an ascending flight of steps leading to a covered passageway that was pierced through the defensive wall of the castle.



Fig. 2.119: South Reservoir 3 during excavation

Running almost parallel to the defensive walls of the castle as well as the city, the rock cut reservoir was outlined into a rectangle measuring 33.40 m east-west and



Fig. 2.120: South Reservoir 3 during excavation



Fig. 2.121: South Reservoir 3 during excavation

Fig. 2.12



Fig. 2.122: South Reservoir 3 during excavation

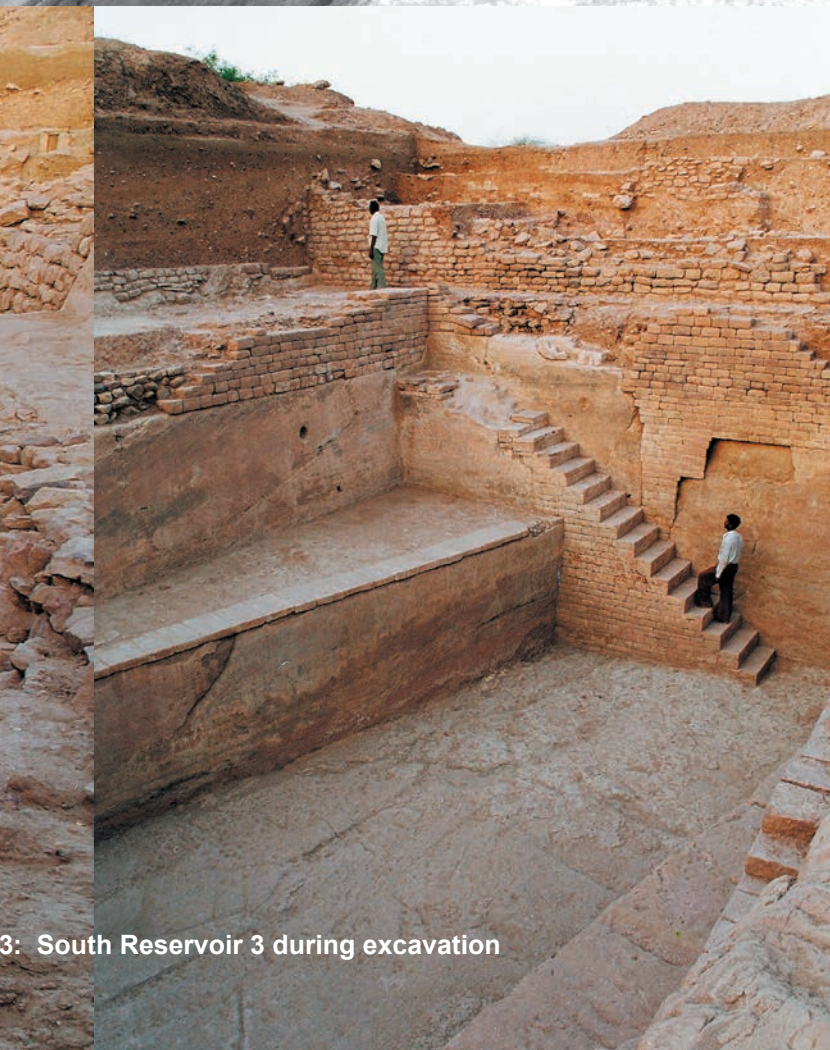


Fig. 2.123: South Reservoir 3 during excavation



Fig. 2.124: Flight of steps, South Reservoir 3



Fig. 2.125: South Reservoir 3 during excavation



Fig. 2.126: South Reservoir 3



Fig. 2.128: South Reservoir 4



Fig. 2.129: South Reservoir 4



3 during excavation



Fig. 2.127: Full configuration of South Reservoir 3



5



Fig. 2.130: Ramp and inlet channel of Reservoir 4

8.90 m to 9.45 m north-south while its bottom had two different levels: the lower one at the depth of 7.90 m from the ancient working surface (8.36 m below from the presently prevailing one); and the upper being at 5.90 m to 6.50 m. In fact, the deeper level pertains to the through that was cut into the eastern half of the basin of the reservoir. It has measured 15.50 m long and 5.65 m broad but oriented, most significantly, oblique to the sides of the main basin at a deviation of 14°. The remaining two were oriented somewhat differently from the rest of the reservoirs while both are rock-cut ones. The east-west length of the fourth reservoir's northern wall measures 11.40 m while its southern counterpart is about a meter less, say 10.34 m. On the eastern-side the width measures 7.10 m, whereas on the west, it is 7.10 m, whereas on the west, it is 7.95 m. The fifth reservoir measured 16.35 m along east-west on the south and 11.10 m north-south along the eastern side, was largely and, perhaps, intentionally left unfinished with an end-to-end meandering depression along its southern side. The shallower part of the reservoir measured 3.40 m and deeper area went down to 3.40 m. The **series of southern reservoirs, thus represent a unique and exemplary planning to harness the rainwater flowing through the River Manhar in an effective manner to sustain the habitation during the lean periods. No such system of series of reservoirs is noticed from the other contemporary Harappan settlements.** This is an outstanding example of the endeavour of the Harappans settled in the hostile environment largely dependent upon the meagre resources.

2.A.xiv Storm water drains and other drain networks

The **castle has yielded an interesting network of drains, both small and large, coming from different areas, and ultimately connected to an arterial drain that runs underground in the broad-way.** The larger ones are high and broad enough to allow a person to walk through them easily. All these drains are usually found containing fresh water deposits, and not sewage nor household waste, nor are these connected to house drains. It was only during Stage VI that a house drain seems to be discharging in to one of the storm water drains, when those had already become defunct. The purpose of these drains was surely to let out the monsoon run-off, which is why these are found furnished with air ducts at short intervals. There are two large drains in the castle. One originates from the bastion beside the east gate and the other from the area close to the north gate. The former is connected to a stone-paved platform provided a top the eastern fortification wall near the east gate.

The rainwater falling on the top of that part of the wall may have been collected there from where, through a beautifully cut-stone cascade, it flowed into a covered drain running under the broad-way of the castle. Running towards the west, the drain meets somewhere near the centre with another principal drain which is found, in turn, to be issuing from two interconnected chambers made of stone. The clay deposit in the chambers was found thoroughly churned up as if under the force of water falling from a height. There was apparently no source of water. To explain this, it may be added that there runs a pathway between these chambers on one side and the northern castle wall on the other. There have been laid bare two columns found abutting the fort wall while the other two are attached to



the above-mentioned twin chambers. It is postulated that these columns supported conduits made of pottery, wood or stone to conduct the rainwater falling on the top of the nearby north gate as well as the adjoining fortification wall and letting it fall with a force into the chamber(s) down below from where it flowed into the large covered drain.

To that, another drain, having its head in the form of steps at a short distance away in the east, met the former drain nearly halfway down. The combined water of these two drains joined that was flowing in the arterial drain coming from the eastern wall. Before that the water, hereto, flowed down a cascade. On its westward march, the arterial drain running all through under the broad-way hit the side wall of the stepped pathway near the west gate and then turned at a right angle to take a southerly course. Some distance short of the south-western corner of the castle, it again took a right-angled turn to pierce through the western castle wall. Before that, just at the turn, it was met with another covered drain coming from the east. The united water of all the drains was then falling through another cascade into the drain down below running in the bailey, which finally carried the rainwater into a *kacha* reservoir that was carved out in the western part of the bailey itself. All the drains were made, carefully with smooth floors, sidewalls, capstones for roofing and air ducts at intervals. If a small segment of a principal drain did yield some doubtful material, it offered cult images and objects. In fact, one or two of its apertures remained exposed during Stage VI definitely and in Stage VII possibly. Any abuse was not at all impossible. It must also be borne

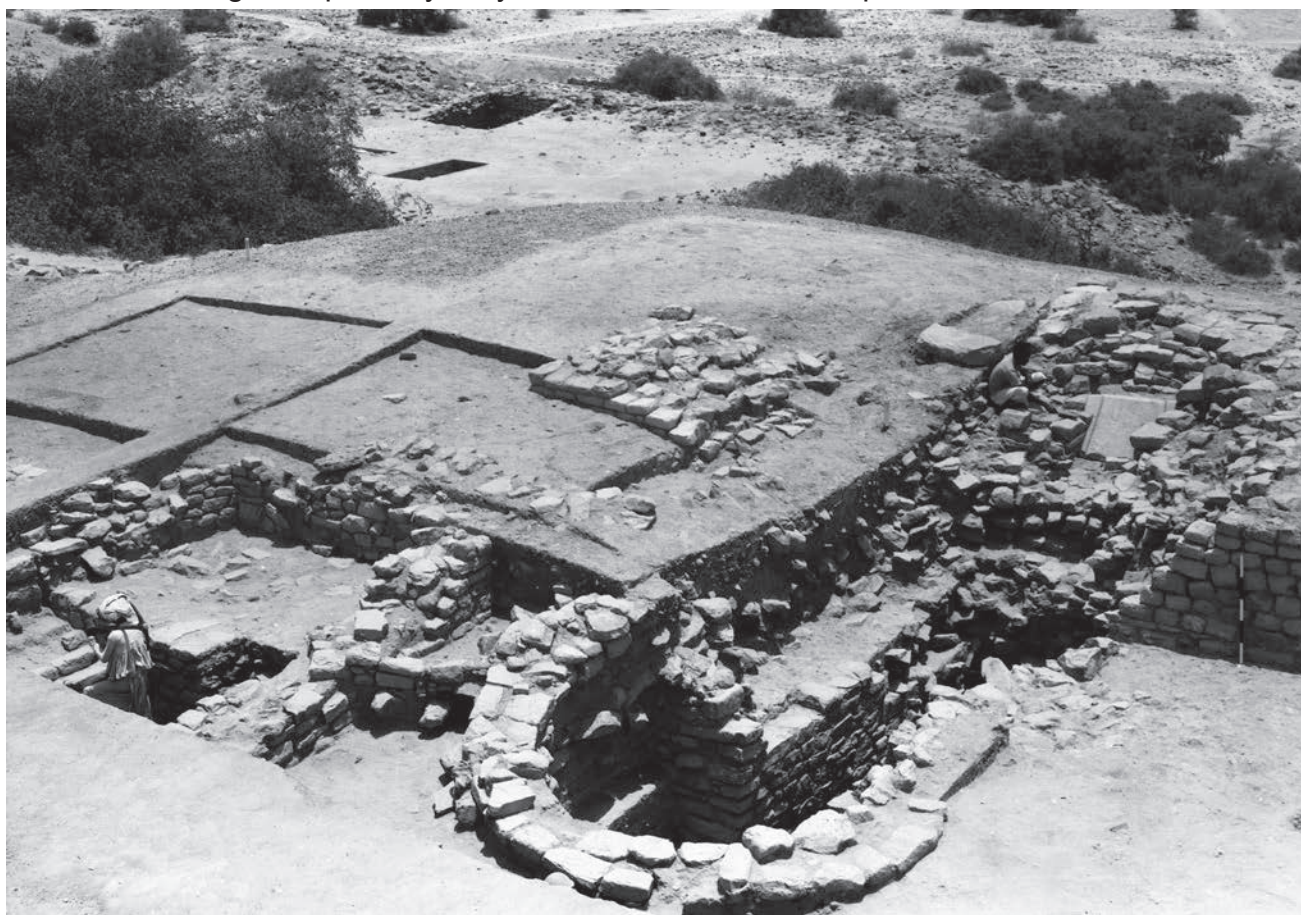


Fig. 2.131: East - West drain for rainwater and surface run off near the East Gate



Fig. 2.132: Panoramic view of the East - West drain originating on the eastern arm of fortification





Fig. 2.133: Cascade of the east - west drain



Fig. 2.134: Cascade of the east - west drain



Fig. 2.135: Details of the cascade of the east - west drain



Fig. 2.136: Top view of cascade of the east - west drain



Fig. 2.137: Junction of N-S and E-W drain and man-hole



Fig. 2.138: Junction of N-S and E-W drain and manhole

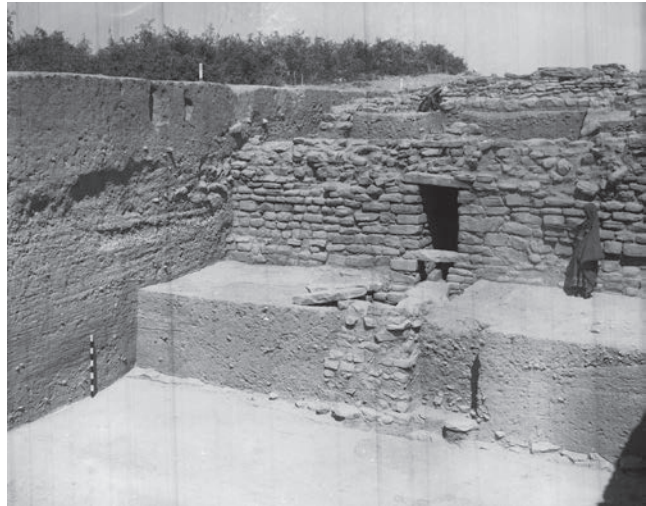


Fig. 2.139: Details of a manhole



Fig. 2.140: Junction of N-S and E-W drain and manhole during excavation



Fig. 2.141: Junction of N-S and E-W drain and manhole during excavation



Fig. 2.142: Manhole during excavation

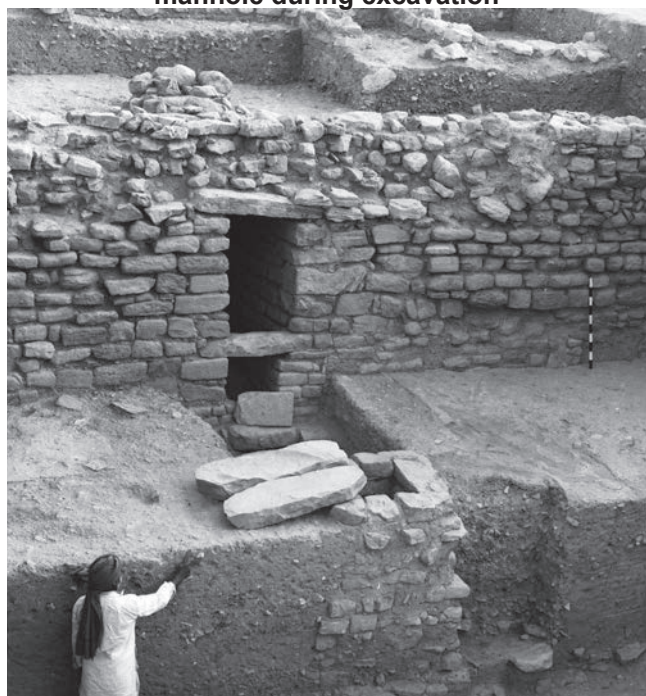


Fig. 2.143: Manhole during excavation



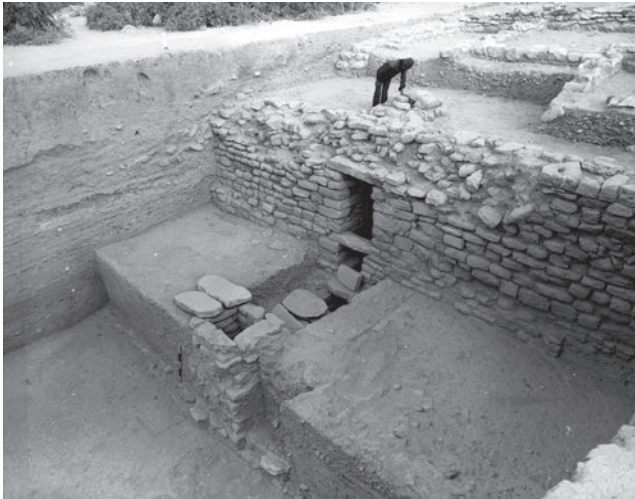


Fig. 2.144: Manhole during excavation



Fig. 2.146: Manhole during excavation



Fig. 2.145: Details of manhole during excavation



Fig. 2.147: Details of drain near North Gate



Fig. 2.148: Details of a manhole



Fig. 2.149: Manhole near the fortification



Fig. 2.150: Details of a drain



Fig. 2.151: Details of a drain



Fig. 2.152: Terminal point of storm water drain



Fig. 2.153: Terminal point of storm water drain





Fig. 2.154: Terminal point of storm water and cascade



Fig. 2.155: Terminal point of storm water and cascade



Fig. 2.156: Underground drain, Ceremonial Ground



Fig. 2.157: Underground drain, Ceremonial Ground



Fig. 2.158: Stone cut drain with coping stones, Lower Town

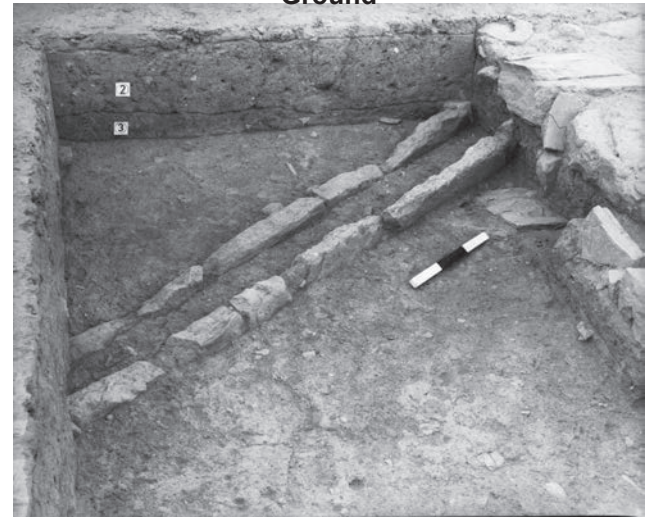


Fig. 2.159: Stone cut drain, Middle Town



Fig. 2.160: Stone cut drain with coping stones, Lower Town





Fig. 2.161: Concealed drain draining into a soakage pit, Lower Town

in mind that none of the drains of the network was found connected to domestic houses right up to Stage V. So far disposal of the household waste is concerned, the middle town, the lower town and the annexe have presented the evidence of sanitary jars or stone-made sanitary tanks placed or provided on the streets.

Thus, the **presence of a series of drain networks, at least on the Castle of Citadel at Dholavira is an exemplary example of ingenuity, ingenious planning to let off the surface water in an effective and smooth manner.** This speaks volumes of the understanding of hydraulic engineering in the most advanced manner, as the construction of receptacle for collecting the rainwater and surface run offs, designs of underground drains, placement of manholes at suitable intervals, calculation of slope according to the requirement in order to prevent any chances of stagnation of water which may cause internal flooding and ultimately weaken the interior of the fortification, all such minute details were taken care off. **Such a networks of drains is unnoticed from any Harappan site or contemporary settlement in the Indian sub-continent, and is of a unique and exemplary nature. This is also an excellent example of civil and hydraulic engineering.** Further, the purpose of this drain network was very well understood and kept under control and drained into a secluded reservoir, maintaining a clear distinction from other reservoirs located southwards and westwards, indicate the multiple purposes of drain networks created by the Harappans at Dholavira.

2.A.xv Ceramic finds from different stages

The ceramic assemblage of Dholavira can broadly be classified into two groups viz., The Harappan and the associated wares. The Harappan wares further consist of a variety of types such as Red ware, Pink ware, Buff ware, and Gray/Black wares. These wares are noted for its material quality (well levigated fine clay often mixed with sand as temper), surface treatment (neatly applied thick to thin slip of varying colours like deep to light red, pink, chocolate, black and cream) with oxidized cores and minimal pores. The fabric mostly consists of thick to thin often with a thick sturdy feeling. The decorations consist mainly of paintings (black on red, chocolate or black on buff, crimson on chocolate with naturalistic and geometric designs), incisions or graffiti (pre and post firing).

The second group consist of wares such as medium coarse red ware, coarse red ware (with a characteristic self-slip/wash with sand on surface often mixed with calcium encrustations and fibers), reserved slip ware (varying colour, texture and composition), black and red ware (fine fabric, similar to Ahar) and kaolinite/white wares. These wares are distinct from their former in fabric, texture and decoration. Both these categories are found in all cultural stages (Stage I-VII) of Dholavira in varying percentage and flavour speckled with variety of shapes and decorations, suggest the continuity and change in the Harappan potting tradition through time. A close observation of the ceramic types, decoration and technique of manufacturing (Clay processing, throwing or shaping, and firing) suggest two main cultural streams: one progresses in to the Harappan standards and the other which is different and continues throughout the occupation with its own continuity and change. The presence of Black and red ware (fine to medium fabric often painted in white) offers a connecting link between the later chalcolithic cultures of central and western India. Chronoculturally, the long ceramic sequence at Dholavira (Stage I-VII), can broadly be grouped into four phases. Here, Phase I represents Stage I to II (Early Harappan) and Phase II represents Stage III, IV, and V (Mature Harappan), while Phase III is represented by Stage VI (late Harappan). The terminal phase of Phase IV is represented by stage VII (late/post), thus altogether displays the origin, growth into its zenith, and gradual decline of Harappans at the site.

The most noteworthy feature of ceramics from Dholavira is its indeclinable association with the local / regional chalcolithic cultures, both from Gujarat and Sindh regions. The presence of ceramics similar to Amri IIB period from Stages I and II clearly indicate the cultural contacts and interactions with the Sindh region, in particular with the Amri cultural assemblage, which possibly explains the establishment of an evolved settlement, with all planning and features of a typical Harappan settlement. The shapes and decorations of ceramics of Stages IV and V matches with the classical Harappan (Sindhi Harappan) style, along with regional manifestations and variations and many times miss the classical (fine) fabric and texture. Deliberate efforts from the potters have been done at the site to produce the classical shapes with local clay and extensively depend on the external treatment to make the ceramics looks like that of the typical Sindh region. Except a few occasions, similar clay has been used for the making shapes



of distinct ceramic tradition at the site. A major characteristic difference noted is the technique employed for production, as in most cases the Harappan wares are made out of clay processed through a “technique of repeated illustration and addition of fine to medium sand as temper” while the second category hold the key of “sieving and hand picking of the unwanted elements” after crushing the clay lumps.

The major pottery types are Harappan (Red ware, Buff ware, Gray / Black ware, Black Slipped Jar, perforated jar) and Associated wares (Medium coarse red ware, Coarse red ware, Reserved Slip ware, Black and red ware, Kaolinite ware). Among them, the black and red ware is found in the later stages of Stage V and dominantly during Stage VI. This ceramic also indicates the interaction of Dholavira occupants with the chalcolithic cultures of southern Rajasthan. The Reserved Slip Ware is a typical ceramic tradition of the Kachchh region, of which oxidised and reduced varieties are noticed. Interestingly, examples of both the varieties have been found in Mesopotamian sites (Possehl 1996) possibly indicating interactions of Harappans, in particular, Kachchh Harappans with that region. Further, the findings of Black Slipped Jar from Dholavira is another important finding, a near complete specimen of which indicates the maritime contacts of the Dholavira Harappans. This particular specimen is found from several sites in Oman and now it is clearly understood to have been utilised to transport goods and commodities through ships / boats.

2.A.xvi Craft specialisation and Dholavira

Various craft activities noticed at Dholavira is another hallmark finding apart from the architectural marvels the city has displayed. The close proximity of Dholavira to various raw material resources helped in the access to these sources as wit-



Fig. 2.162: Ceramics of Stage I and II, Dholavira



Fig. 2.163: Ceramics of Stage I and II, with a few Amri IIB ceramics



Fig. 2.164: Kaolin Ware of Stage III



Fig. 2.167: Painted pottery of Stage III



Fig. 2.168: Harappan ceramics of Stage IV



Fig. 2.169: Harappan ceramics



Fig. 2.172: Black Slipped Jar



Fig. 2.173: Perforated Jar



Fig. 2.174: Harappan ceramics





Fig. 2.165: Kaolin Ware of Stage III



Fig. 2.166: Kaolin Ware of Stage III



ceramics of Stage IV



Fig. 2.170: Harappan ceramics of Stage IV



Fig. 2.171: Harappan ceramics of Stage IV



s of Stage IV

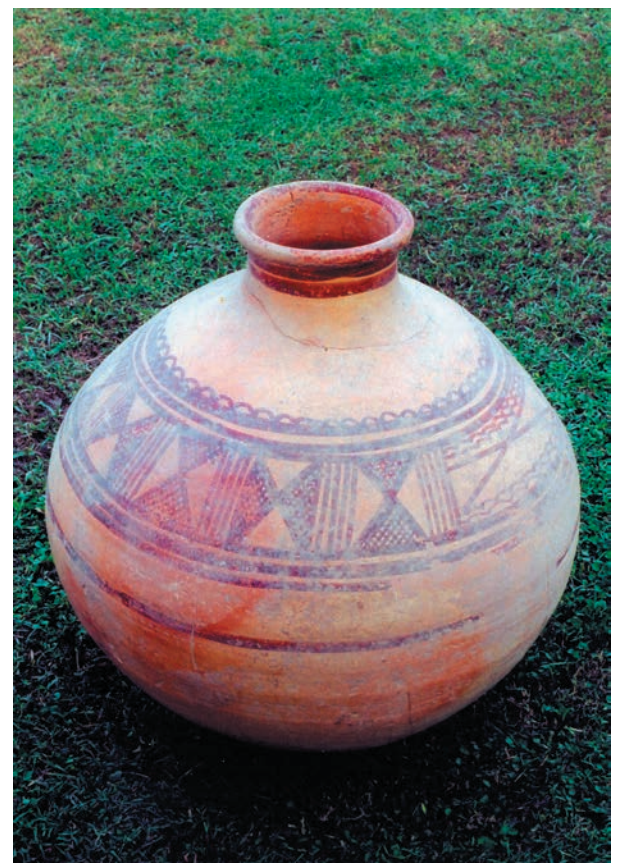


Fig. 2.175: Pot of Jhukar Ware, Stage VI



Fig. 2.176: Harappan ceramics of Stage IV



Fig. 2.177: Reserved Slip Ware, Stages IV and V



Fig. 2.179: B&R Ware, Stage VI



Fig. 2.180: B&R Ware, Stage VI





V & V



Fig. 2.178: Reserved Slip Ware, Stages IV & V



Harappa: Male
Burial with ornaments



Harappa: Raw material from
Mound E and finished bead
from Burial



Dholavira: Raw material

Fig. 2.181: Example of interaction between two major Harappan settlements
for exchange of raw materials

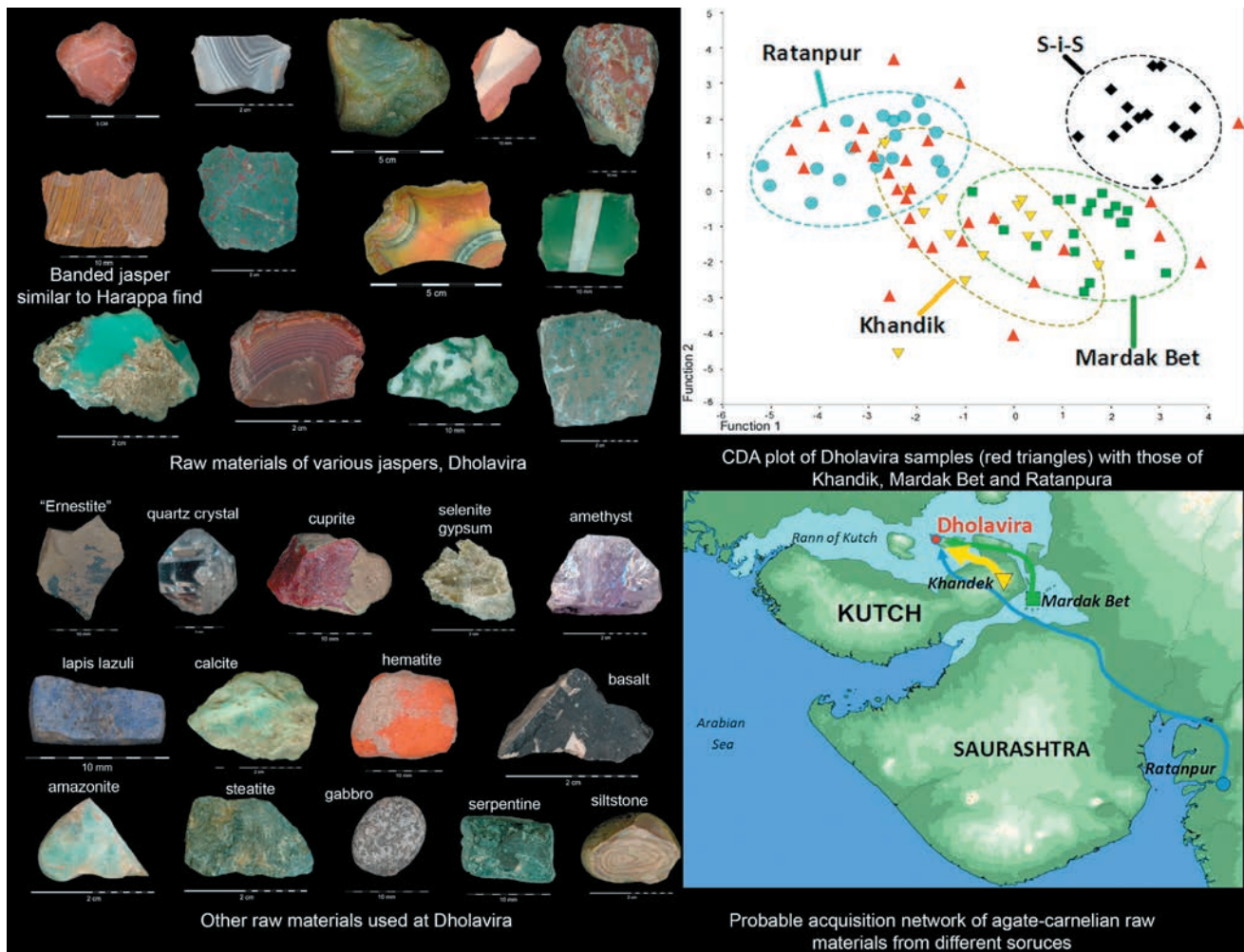


Fig. 2.182: Examples of various raw materials and their scientific analysis to identify the sources



Fig. 2.183: Beads of various raw materials



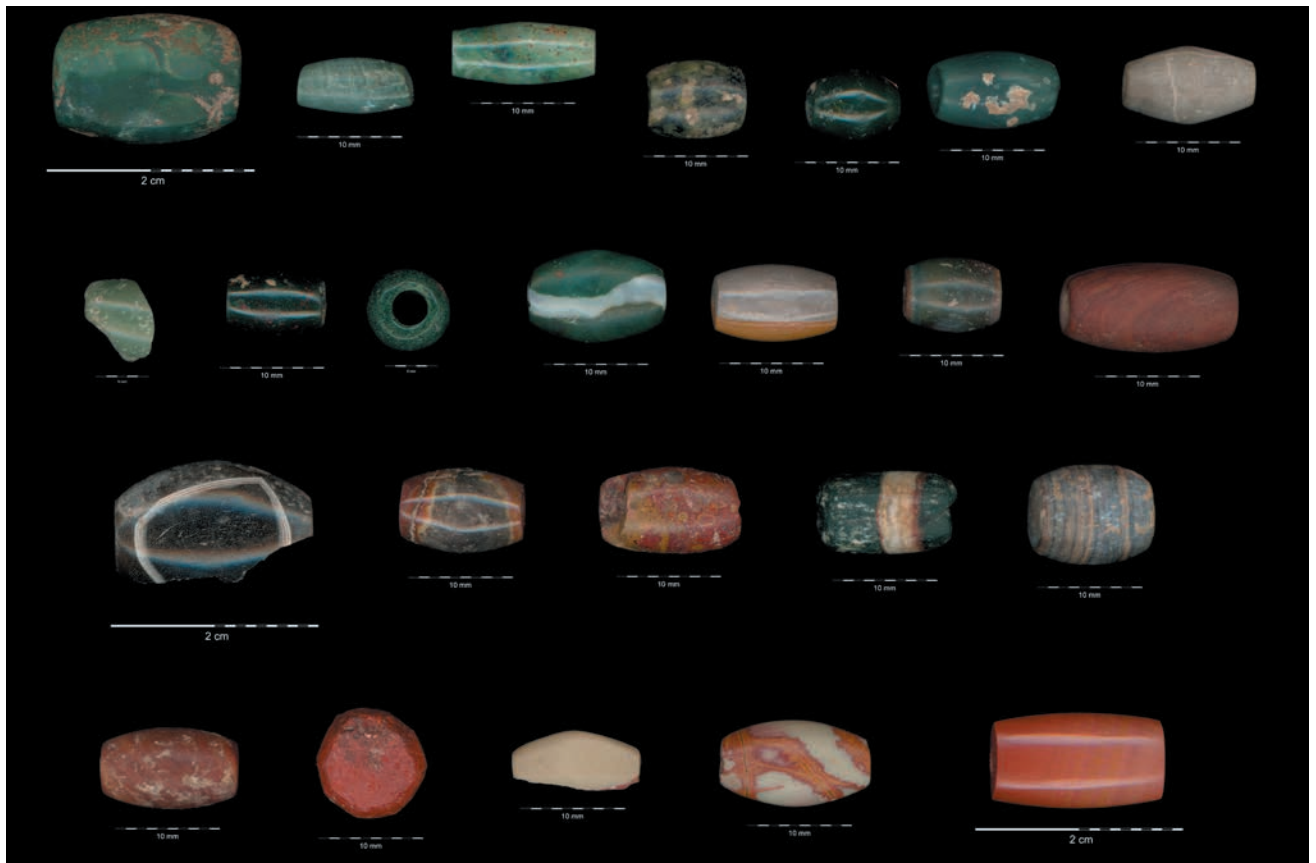


Fig. 2.184: Beads of various raw materials

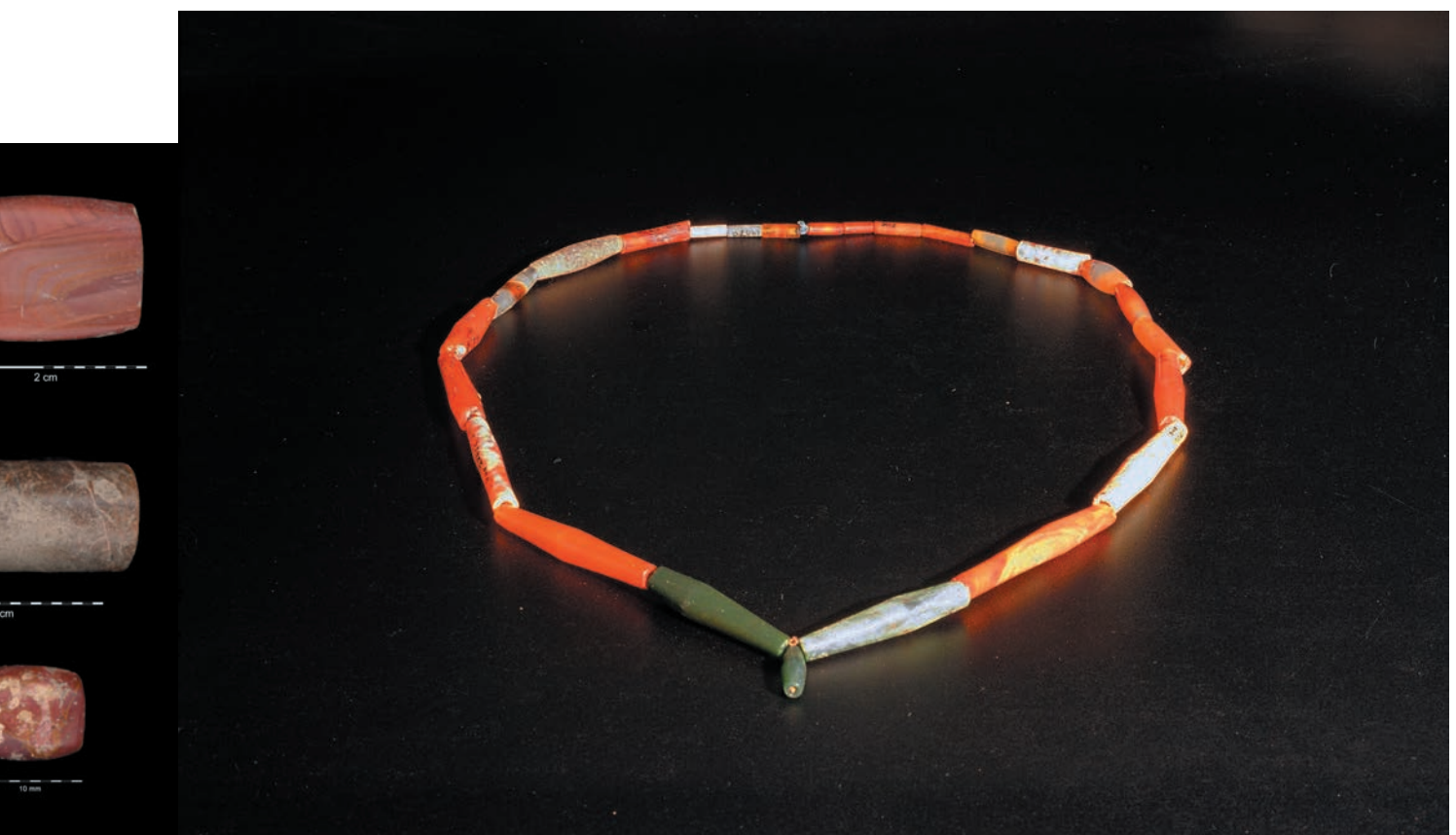


Fig. 2.185: Beaded necklace of assorted beads



Fig. 2.186: Long barrel cylindrical beads of agate-carnelian

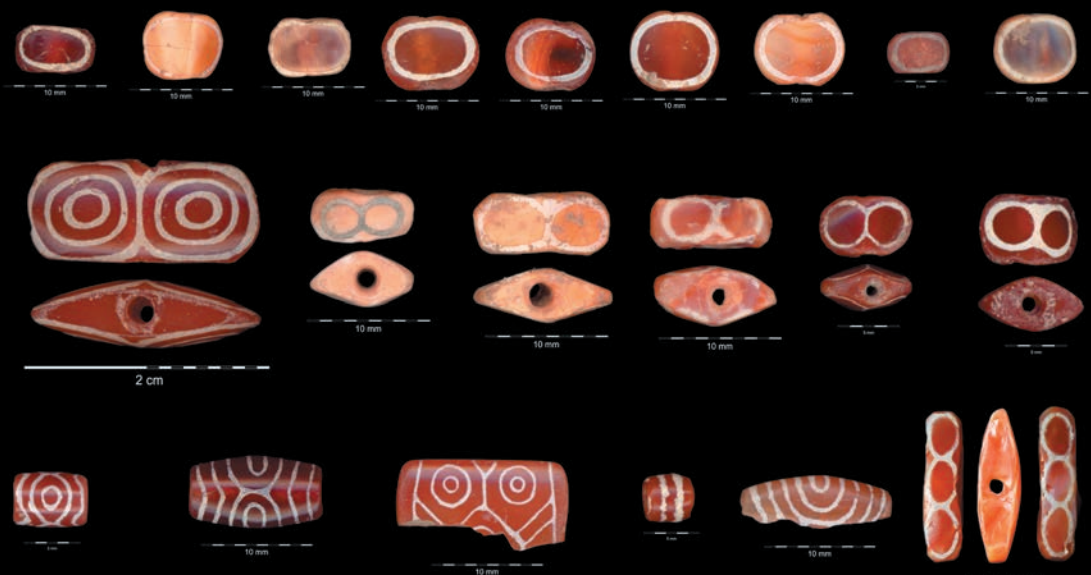


Fig. 2.187: Decorated / etched beads of agate-carnelian

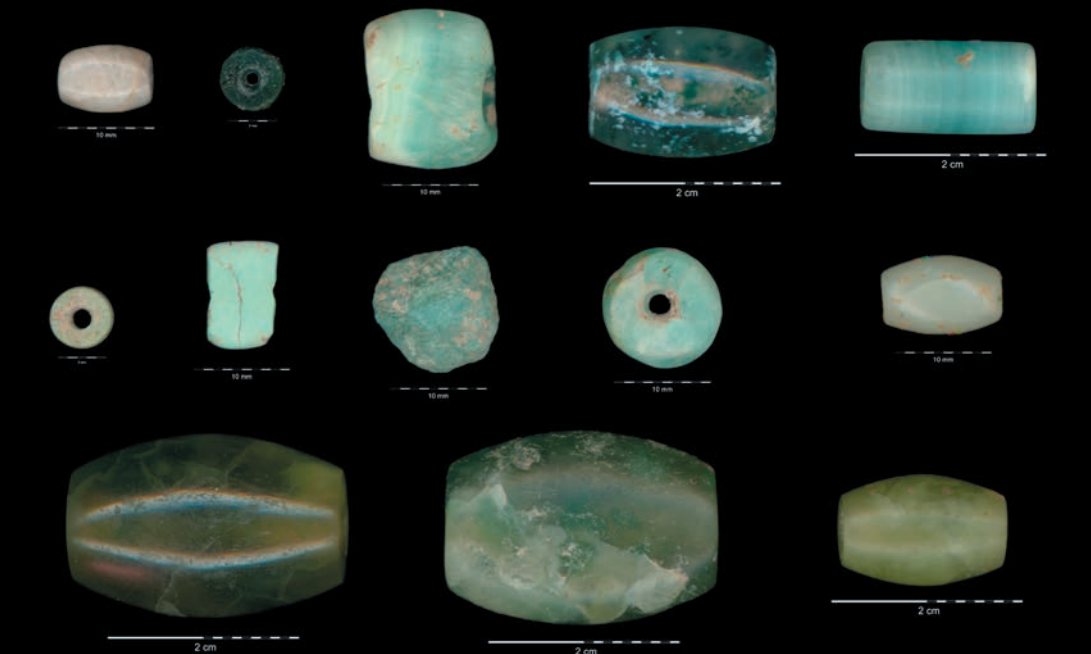


Fig. 2.188: Beads of amazonite, vesuvianite and moss agate

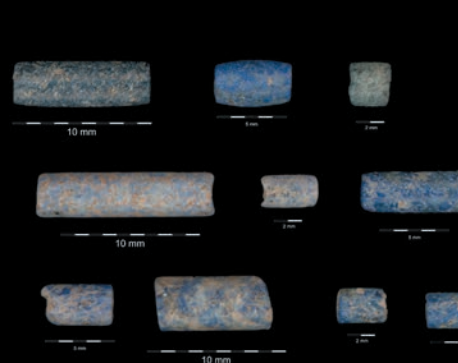


Fig. 2.189: Beads of lapis lazuli

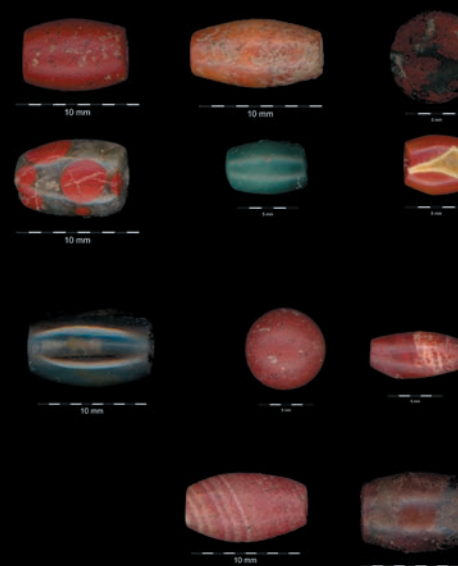


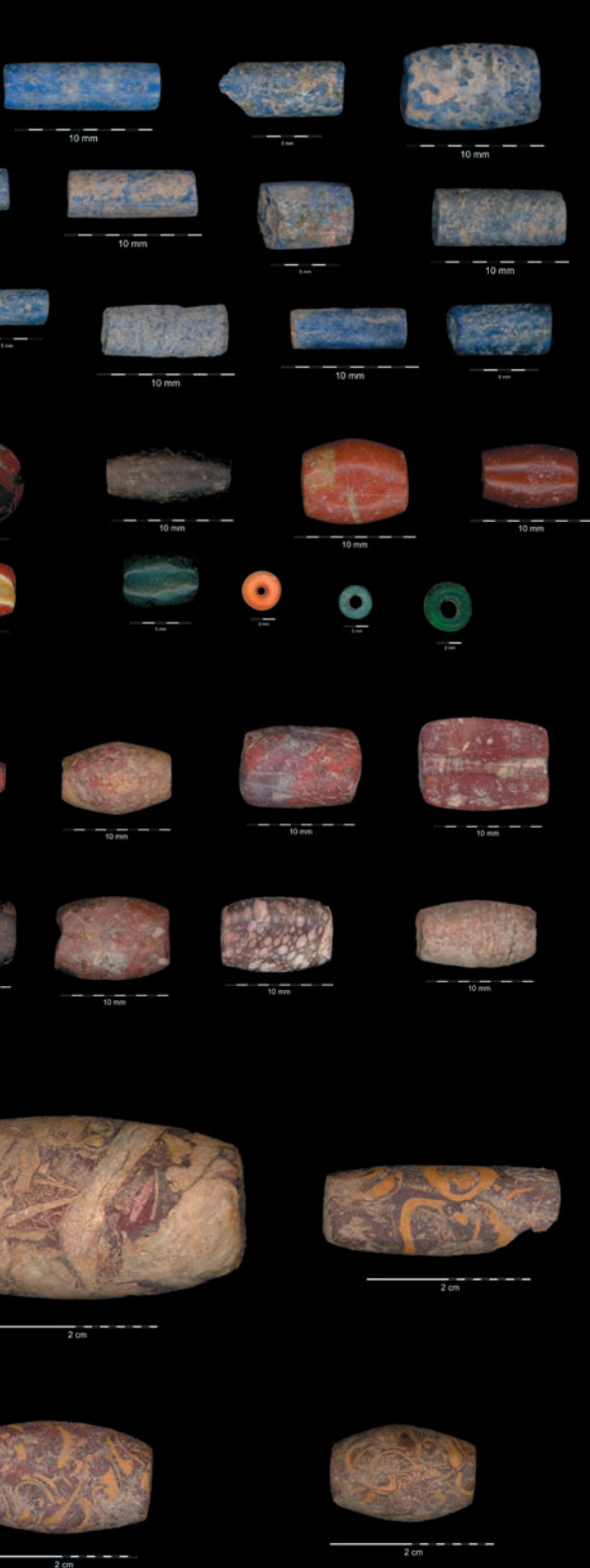
Fig. 2.190: Beads of jaspers



Fig. 2.191: Beads of fossiliferous limes



Fig. 2.192: Types of drill bits



stone



Cylindrical drills

Pointed

Fig. 2.193: Types of drill bits



Fig. 2.194: Beads of mudstone / sandstone



Fig. 2.195: Bead roughouts / unfinished beads

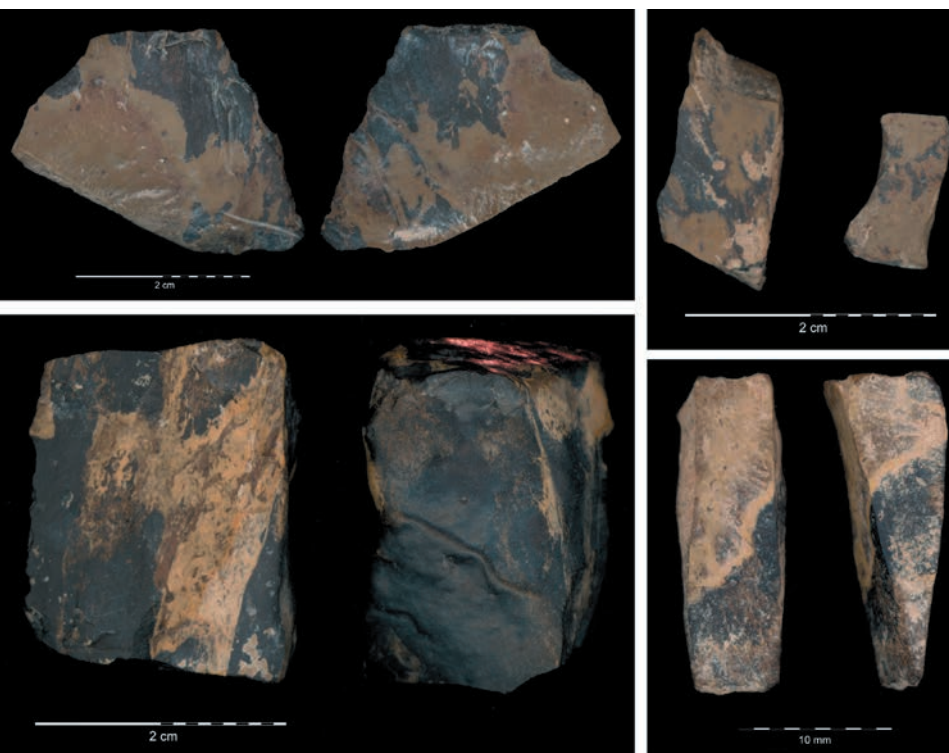


Fig. 2.196: Ernestite raw material

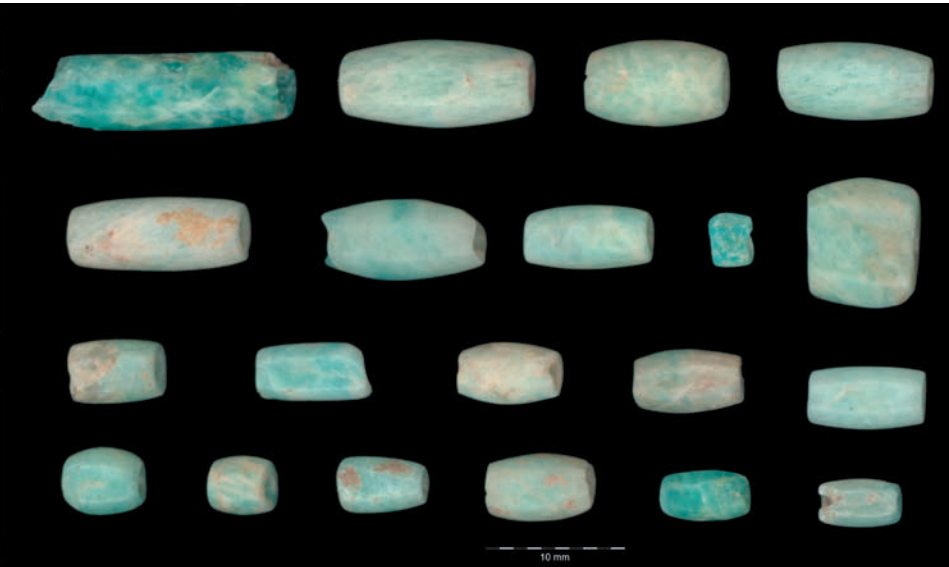


Fig. 2.197: Beads of amazonite

15267

Cache of 841 beads

643 carnelian

143 red jasper

27 black & white agate

15 sandstone

13 lapis lazuli

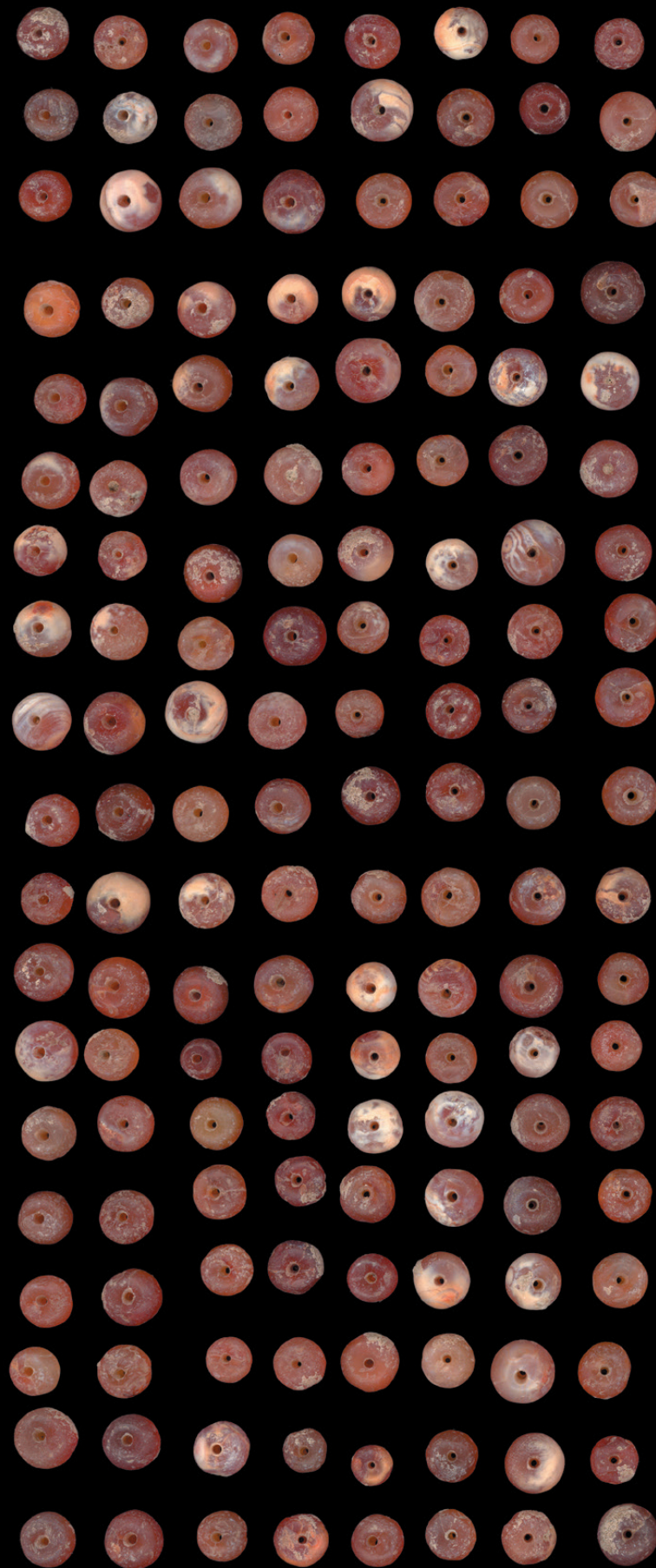
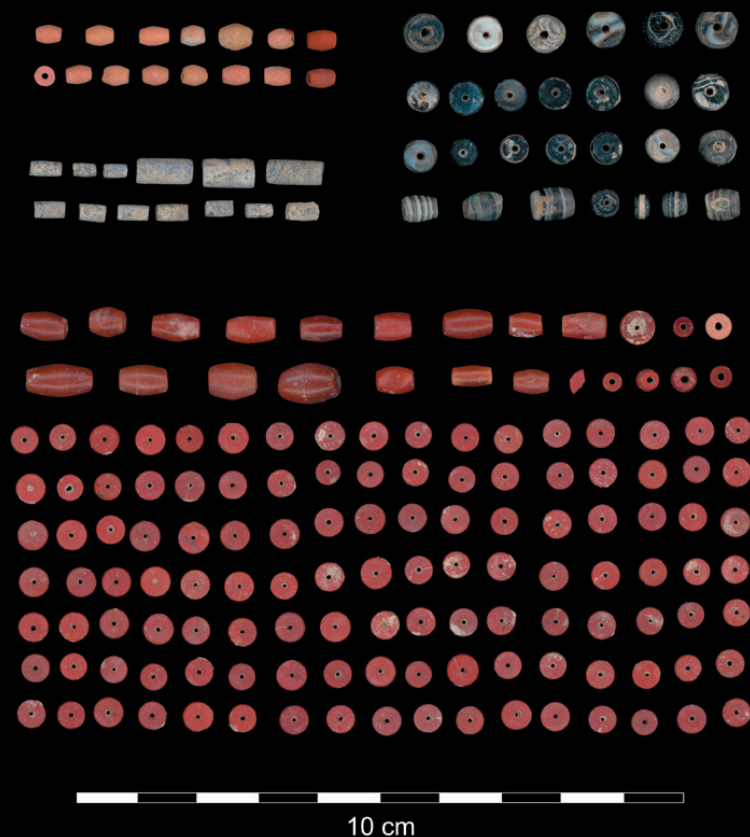


Fig. 2.198: A cache of 841 beads



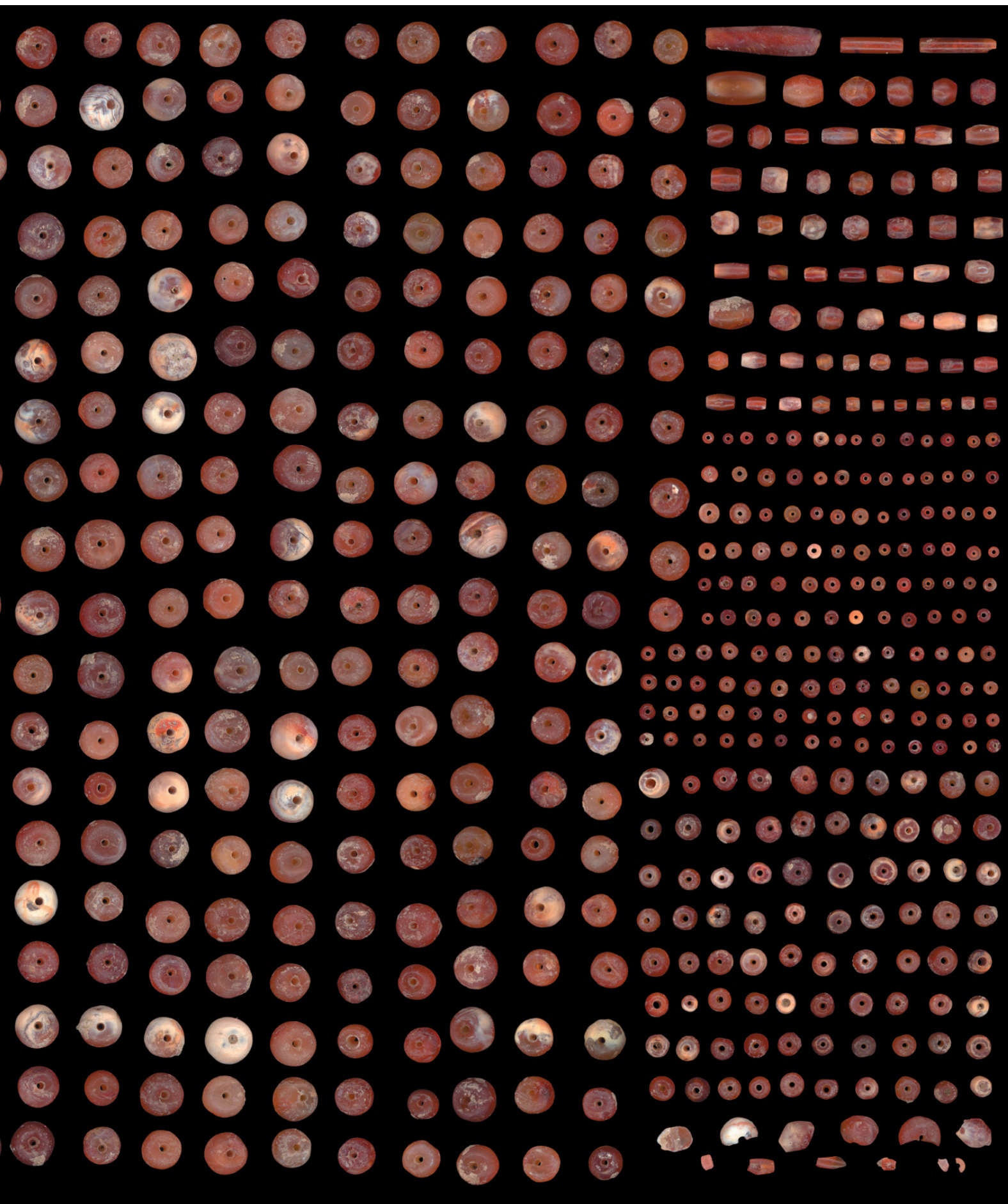




Fig. 2.199: Bead workshop area of Stage VI, Bailey

(a)



Fig. 2.201: Bead polisher *in situ*, Bailey

(b)

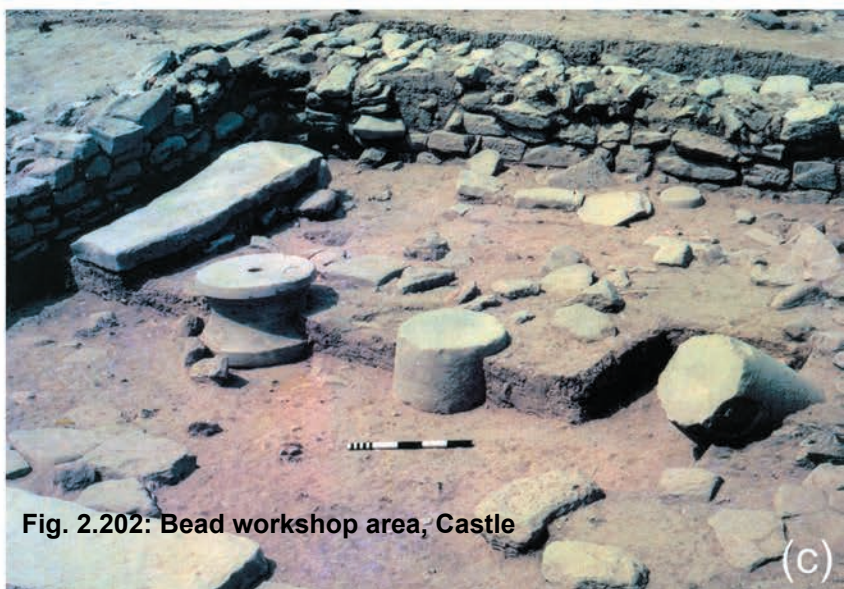


Fig. 2.202: Bead workshop area, Castle

(c)



Fig. 2.200: Bead workshop area during excavation, Castle



Fig. 2.203: Cache of beads near West Gate of Castle

nessed by the presence of both raw materials and finished products. The scientific analysis of raw material acquisition and finished products made from materials like agate-carnelian, copper, lead, silver, steatite from the site of Dholavira (Bisht *et al* 2015 and Bisht 2017). Apart from the craft industries specialised in the production of various products like lapidary working, shell manufacturing, copper smelting, lithics, seals, steatite artefacts, metal jewellery (gold, silver, copper and lead), stoneware bangles, Dholavira stands apart in comparison to other sites in terms of two specialised products. These are the manufacture of limestone pillar members and bead manufacturing involving 'erectite' drill bits. A look into the various craft industries will help in the understanding of the role played by the Harappan city of Dholavira in the overall craft production, acquisition, production and probably redistribution of finished products to various other Harappan settlements and probably to destinations in West Asia.

2.A.xvi.a Lapidary Working

An extensive evidence for the production of beads of various raw materials like agate-carnelian, jasper, lapis lazuli, chalcedony, faience, terracotta, shell, vesuvianite, turquoise, amazonite, to name a few, is available. It has been estimated by the excavator (Bisht 2017) that the beads from the site of Dholavira may number

around 12,000. An analysis of around 3,500 beads from the site clearly indicates the popularity of steatite (28.4%) as the most preferred raw materials for the manufacturing of beads followed by terracotta (21%), agate-carnelian (15.4%). The analysis also indicates that since the very beginning, evidence for bead manufacturing is noticed at the site. However, the zenith is noticed during the Harappan period represented by Stages IV and V, with most number of raw materials. Bead manufacturing, however, continued even during the late Harappan (Stage VI) as indicated by the presence of bead workshops. The analysis of around 7700 beads helps in understanding their contexts. 42.9% of the beads came from Middle Town, followed by Castle (33.7%), Lower Town (11.2%) and Bailey (2.1%). This finding, when analysed in consonance with the findings of drill bits also in-



Fig. 2.204: Examples of graffiti and inscriptions on pottery, stoneware bangle



icates that the Middle Town served as a hub of manufacturing stone beads and also finished products found from this part of the city.

The presence of bead roughouts, beads in various stages of manufacturing, polished beads without perforation, half perforated beads, bead workshops, a large number of discarded drill bits, particularly of 'erdestite', all attest the role played by Dholavira in the manufacture of stone beads. The remains of bead workshops, at least three in number were excavated from the site of Dholavira. One workshop belongs to Stage V, the terminal phase of Harappan culture, located near the East Gate of Middle Town, which also brought to light a good number of polished agate-carnelian beads, but unperforated. Two more workshops came to light near the North Gate of Bailey and West Gate of Castle, both belonging to Stage VI. While the bead workshop near the North Gate of Bailey consisted of several bead polishers, evidence of bead polishing indicated by the presence of linear grooves, in particular on one stone almost on all sides. This polisher was found in a room, with evidence of seating arrangement on all sides, indicating a community participation of a group of workers engaged in polishing. The evidence near the West Gate consists of arrangement of stone pillar members, evidently removed from their original locations and placed here to serve as platforms or anvils. This workshop brought to light chips and fragments of agate-carnelian, clearly by products of bead working.

However, the hallmark finding from Dholavira is an extraordinary number of 'erdestite' drill bits, which were used to perforate the harder stones of agate-carnelian, jasper, chalcedony, bloodstone (harder variety of jasper). A total of 1588 drill bits of erdestite along with raw materials were recorded, found from different parts of the site, clearly indicating their usage right across the settlement. This is so far the largest number of erdestite drill bits recorded from any Harappan settlement. The presence of such a large number of drill bits also enabled to understand the typology and to investigate the surface modification of the tip portion, due to the result of clockwise and anticlockwise movement. The terminology of erdestite has been tentatively suggested by Kenoyer and Vidale (1992) after Ernest Mackay due to the lack of knowledge of its geological provenance so far. Ernest Mackay is the first archaeologist to study these drill bits from the site of Chan-hudaro and later, its study was undertaken by several archaeologists, including S.R. Rao, G.L. Possehl, J.M. Kenoyer, Massimo Vidale. The extensive study has helped in the understanding of the physical as well as chemical properties of this materials, which also helped in identifying the concentrations of magnetite and iron-titanium phases, along with quartz and silimanite. These properties enabled this stone suitable for the drilling of harder stones like agate-carnelian and jasper, which ranks 7 in the Moh's scale of hardness.

The analysis of this drill bits, both on a temporal and spatial scale at Dholavira clearly indicates the manufacturing hub in the Middle Town area and the manufacturing of beads using these drill bits was at its peak during the mature Harappan phase represented by Stages IV and V at Dholavira. Further, a large number of drill bits with broken tips (40.2%) clearly indicates their nature of industrial waste after their complete exploitation. The drill bits were also used even after



breakage given their rare and immense importance in nature. The large number of drill bits also enabled to evolve a typology, such as tapered cylindrical, cylindrical, constricted cylindrical, re-used, re-sized and pointed (Prabhakar *et al* 2012).

The study of the raw materials using Instrumental Neutron Activation Analysis (INAA), in particular of the agate-carnelian used in the production of the beads was also extensively made by Randall Law (2017), which helped in the identification of sources like Khandik (70 km from Dholavira in Eastern Kachchh), Mardak Bet (105 km from Dholavira in Little Rann of Kachchh) and Ratanpur (390 km from Dholavira in South Gujarat). The raw materials and the complete beads were identified to be from these three sources. Further, the raw materials were also transported to other destinations like Harappa, as a specific find of a banded jasper (both in raw material form and artefact) illustrates this. The excavations at Harappa brought to light a raw material of banded jasper from Mound E, very similar to that one found only from Dholavira. Further, a finished bead of the same material came from the Cemetery R37 at Harappa from a male burial, along with other ornaments. This clearly **demonstrates the long distance trade facilitated by the Dholavira Harappans, as this site was closer to the various raw materials resources.**

2.A.xvi.b Inscriptions, graffiti, Seals and Sealings

As it is typical of an urban Harappan settlement, Dholavira also yielded the presence of inscriptions on various mediums, including stone, inlaid, seals, pottery, stoneware bangle among other and also a good number of graffiti on pottery. The evidence of graffiti has been documented on 185 potsherds consisting both pre-firing (69%) and post-firing (31%) graffiti marks. Most of the pre firing marks are deep and sharp in execution while the post fired are shallow in nature. The marks are found mostly on vessels such as huge storage jars, medium to small sized pots, vase (rim, shoulder, just above base), dish (outside of brim, rim, and base), dish on stand, goblet (just above base, pedestal), shares slipped and unslipped surface. The major depictions can be categorized as Harappan script/signs (48%) ranging from 1-4 letters, geometric designs (32%) which includes parallel and slanting lines, triangular, zig zag and crisscross patterns etc., Numerals (12%) 1-7 vertical strokes of equal length and breadth, and Abstract designs (8%) like checker and chevron marks, arrow tridents, etc., have been noticed as well. Inscriptions stamped either at the bottom of the vessels (3-4 characters) or on the shoulder/body of the vessels and on triangular terracotta cake deserves special mention as they leave information on resolving the trajectory of Harappan writing system and decipherment.

Signboard

One of the most prominent discoveries from the excavations at Dholavira is the find of a 10 large sized signboard (each sign measuring approximately 30 cm X 30 cm) presently lying in the western chamber of North Gate. This inscription was found lying in the western chamber of north gate. The nature of the find indicates that it could have been fitted on a wooden signboard, most probably fitted above





Fig. 2.205: Details of the location of signboard in the western chamber of North Gate, inlaid pieces made of gypsum and full reconstruction of the signboard



Fig. 2.206: Inscription on a stone block, Bailey

the lintel of the central passageway of the gate. The central passageway of north gate itself measures 3.5 m in width and the length of the inscription along with the wooden frame impression is also more or less same thereby indicating the probable location. The inscription consists of 10 large-sized letters of the typical Harappan script, and is actually gypsum inlays cut into various sizes and shapes, which were utilized to create each size as, indicated above. The exact meaning of the inscription is not known in the absence of decipherment of the script. This inscription is a unique find in the entire Harappan civilization and its discovery and the measurement details clearly indicates its purpose of installation on the frontal portion of the North Gate. Further, the signboard was installed on a wooden base with the aid of inlaid pieces of gypsum, white in colour. **All these features are the first of its kind from the Harappan civilization and indicates the ingenuity of the Dholavira Harappans.**

the lintel of the central passageway of the gate. The central passageway of north gate itself measures 3.5 m in width and the length of the inscription along with the wooden frame impression is also more or less same thereby indicating the probable location. The inscription consists of 10 large-sized letters of the typical Harappan script, and is actually gypsum inlays cut into various sizes and shapes, which were utilized to create each size as, indicated above. The exact meaning of the inscription is not known in the absence of decipherment of the script. This inscription is a

Inscription on a stone block

Another instance of an inscription is noticed from a secondary context in one of the four square underground chambers found at the southern portion of Bailey. The inscription consisting of four letters was found on the shorter face of a portion



Fig. 2.207: Seals of different stages



Fig. 2.208: Complete and incomplete seals of Stage IV





Fig. 2.209: Complete and incomplete circular seals of Stage V



Fig. 2.210: Complete and incomplete rectangular seals of late Harappan phase (Stage VI)



Fig. 2.211: Rectangular seals of late Harappan phase (Stage VI)



Fig. 2.212: Sealings of various types



Fig. 2.213: Sealings of various types



Fig. 2.214: Sealings of various types



Fig. 2.215: Narrative tablets





Fig. 2.216: Narrative tablet (Stage V)



Fig. 2.217: Depiction of a person (deity?) with horned headgear, similar to that of seals from Dholavira



Stage IIIA, Dholavira



Mohenjodaro

Fig. 2.218: Similarity in depiction of a kneeling figure in front of a person (deity?) with horned-headgear from Stage IIIA of Dholavira and a seal from Mohenjo-daro

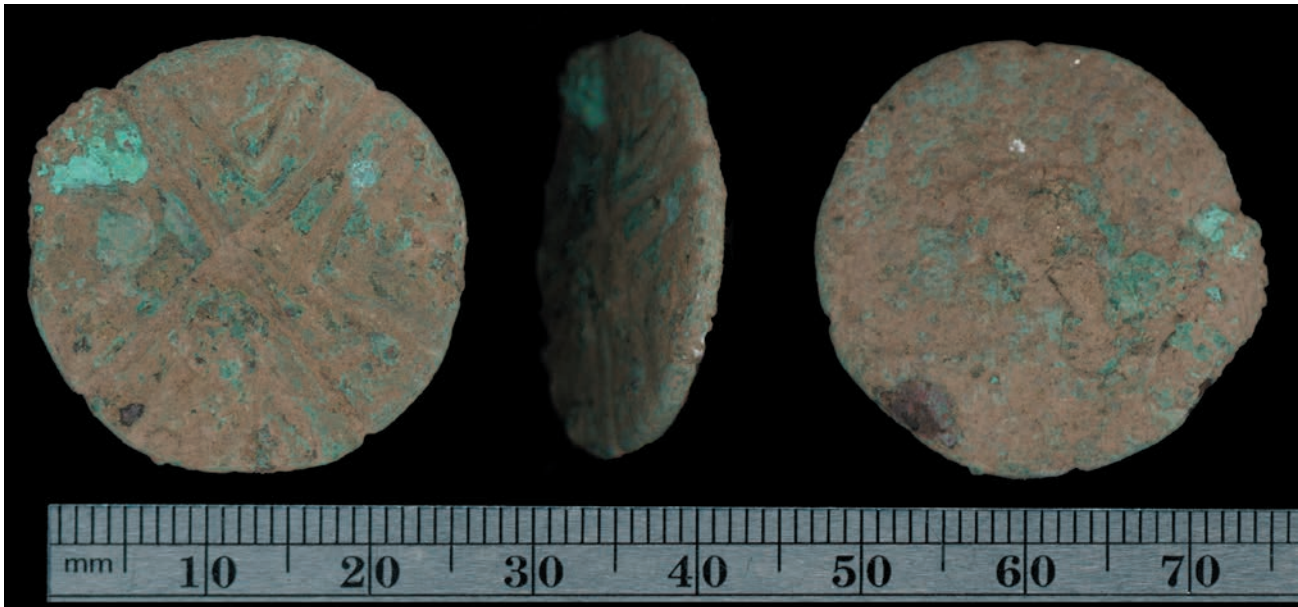


Fig. 2.219: Copper seal with geometrical motif

of what could be a large rectangular limestone slab, originally a lintel of a doorway. The stone block is badly eroded and peeling off in layers could be noticed. The inscription consists of four letters partially preserved due to the eroding nature of the stone. As the stone member was found fixed in masonry of the square underground chambers, it can be deduced that it could have been damaged and hence used as part of a masonry as its original meaning might have been lost. The extant length of the inscription is 16.5 cm while the width is 8 cm. The inscription consists of four letters, while three letters are clearly visible, the fourth one towards the left end is not clearly visible.

Seals and Sealings

During the course of excavation at Dholavira, 225 seals and 60 sealings have been recovered. For better appreciation of types and nature of seals and their temporal and spatial growth and distribution at Dholavira, the findings should be understood with the overall growth and development of the city itself. The seals and sealing found from Dholavira indicates a systematic evolution in terms of evolution of motifs, inscription during the course of the expansion of the settlement and also coinciding with the decline. The sequential growth in terms of sigillography is given below:

Stage	Motif	Inscription	Shape
IIIA	Geometric and mythological	Not present	Square with rudimentary perforated boss
IV and V	Usual Harappan motifs	Yes	Square with classical and sub- classical boss Rectangular ones in upper levels



VI	Not present	Yes	Plano-convex with rectangular face; convex, rounded, triangulated or wagon-vaulted back with a perforation
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No evidence of seals, sealings and tablets or evidence of writing was found during Stages I, II and VII so far. However, potter's marks are occasionally present in the first two. First appearance of seals occurred in Stage III with only one tiny specimen seals. This early seal of steatite is smaller in size, lighter in weight, thinner in section, and furnished with a rudimentary perforated boss at the back there are no inscriptions on this seal although the script had evolved as evidenced from a potsherd bearing three Harappan signs written in black pigment. The seal is depicted with a mythological scene which is closely similar to the one depicted on Mohenjo-daro seal (M-1186A-CISI-Vol. 2). The scene exhibits an iconographic elaboration of the same theme that occurs on the Dholavira example its early evolutionary stage. The same theme has been repeated on seals and terracotta tablets at Mohenjo-daro and Harappa. In Stage IV and V (Harappan), there is a phenomenal increase in seals, bearing iconography and inscriptions, and usually executed deftfully showing all such features, which mark the Harappan sigillography everywhere else in the mature phase at a number of contemporary sites.

During the Stage VI, there is a paradigm change in the typology, ideology and even in material of the seals. These Late Harappan seals are not square, but plano-convex in form. The rectangular face bears the legend with very well cut signs along the longer axis while all the motifs of the previous stages such as animals, composite animals or themes, mythological seals, geometric patterns, or sacred symbols, which may have mostly conveyed the belief system of the people, are conspicuously absent. The convex back of seals is perforated with a hole usually across the thickness. The material of a few seals is characterized to be kaolinite as evidenced by XRD analysis. It seems that the supply of the steatite of requisite quality, which was most likely to come from the Indus region by trade, had stopped. The kaolinite is dirty grey in colour. Such plano-convex seals have been reported from Desalpur IB, Surkotada IC and Lothal, all of which are materially coeval.

The important contribution of Dholavira in terms of understanding the context and importance of seals, written material is in the evidence of evolutionary process of seals. As seen above, the earliest stage, i.e. before the Harappan phase, the absence of any inscription on seals could be seen with only motifs, later the inscription appears as noticed from other Harappan sites and during the late Harappan phase, only the inscription is noticed on rectangular seals, devoid of any motifs. **This sort of evolution combined with stratigraphic evidence is the most important contribution of Dholavira.** Rectangular seals with only inscriptions have also been noticed from the site of Harappa. Among the 61 sealings found from Dholavira, which are positive impressions of the seals, a variety of colours have been noticed like grey, greyish red, dull red, black, etc. Of these, a majority (52 in number) belong to the mature Harappan phase. These sealings were subjected to intensive study by taking impression on the rear side





Fig. 2.220: Indus and Gulf style seals and their provenance in comparison to Dholavira



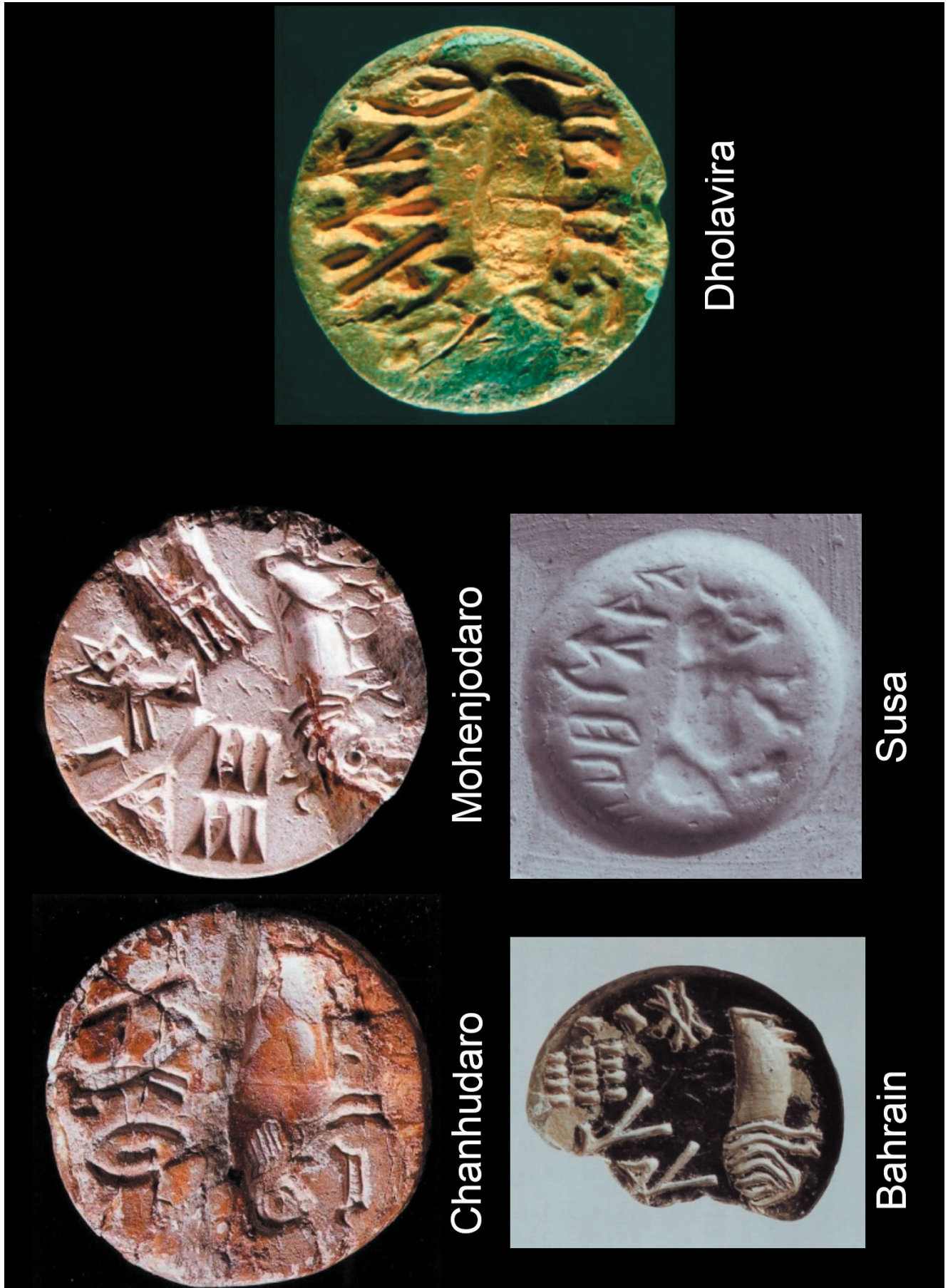


Fig. 2.221: Indus style seals from other sites in South Asia and Mesopotamia

in order to understand the nature of receptacle. The analysis indicated multiple seal impressions in a few cases indicative of hierarchical bureaucratic approvals. Further, the functional study of sealings also helps in understanding the nature of various receptacles like pottery container, joint wooden elements (flat rough), joint wooden elements (round polished), flat surface (converging strings), bag (leather), door (peg-on-wall), jar stopper (vegetable fibres), metal clip fastener, token (round), token (rectangular). The study is under final stages and once complete, a fuller picture of the complexities related to trade related transactions can be understood in a better manner.

Needless to emphasize here that **apart from the study of Lothal sealings (carried out by Dennys Frenez), Dholavira is the second such site that has been subjected to intensive study of the sealings, the nature of receptable, to understand the mechanisms involved in the transactions, nature of locks, containers, bodies on which these sealings were applied.**

Apart from the seals and sealings, very few narrative tablets have been found from the site, a pattern which is also common from other sites like Harappa and Mohenjo-daro. One such tablet is interesting, plano-convex in profile and depicts an inscription on flat side of one surface and a scene depicting two crocodiles, and a combat between a human or a deity and a bull-man. One crocodile each, shown across the width of the tablet, flank the combat scene in which the man on the right is striking the bull-man on the left. Most striking is the dress of the human figure, which wears a peaked cap, or a headgear of two horns, putting on a tunic, parted open below the knees, and also has long boots with upraised toes. The man is about to strike the bull-man, probably with a club-like weapon, held in his left hand while with the right is holding the right hand of the bull-man, with his left hand is raised up words with a bend at the elbow Bull-man has long, outstretched, curved horns, a large hump, a long tail and bovine legs with hooves. The long tunic, peaked cap and high boots with upturned toes are strongly reminiscent of the Central Asian attire. Its find from almost the upper middle of the Stage IV is highly significant. Anyway, the Harappans had established a town at Shortughai in Badakhshan (north Afghanistan); the evidence may not be surprising.

Further to the normally occurring square stamp seals from Dholavira, another important and most interesting finding is the circular stamp seal, often termed as 'Gulf' type or 'Persian Gulf' or 'Indus' type seals found mostly in West Asia and other sites connected with maritime trade. It has been understood that these type of seals were manufactured in the Gulf or Mesopotamia region. These seals are normally circular in nature, made of steatite and having a single groove on the back. One more variety also occurs, which were probably manufactured in the Persian Gulf region and is distinct by the presence of three grooves and decorated with ring and dot motifs. They do not have the Harappan motifs or script on the observe. Scholars identify that the seals belonging to the Indus style dates back to third millennium BCE and the Persian Gulf or Gulf type seals dates to early second millennium BCE. These seals are identified with the maritime contacts between the Harappans and the Gulf and Mesopotamia. The cuneiform records found from Mesopotamia also attest to the region of 'Meluhha' generally



identified with the Harappan civilization, the nature of commodities exchanged with them, the prominent among them being carnelian, wood of various kinds, copper, gold, pearl. The records also mention to other items like Meluhhan style furniture, ships, figurines, birds and animals coming from Meluhha.

One complete seal with five lettered inscription and *Bos taurus* as the motif



Fig. 2.222: Grey and black coloured stone-ware bangles



Fig. 2.223: Grey and black coloured stoneware bangles



Fig. 2.224: Grey and shades of red coloured stone-ware bangles



Fig. 2.225: Stoneware bangles with micro-in-scriptions



Fig. 2.226: Shades of red coloured stoneware bangles



Fig. 2.227: Shades of red coloured stoneware bangles



Fig. 2.228: Grey, black and red coloured stoneware bangles



Fig. 2.229: Terracotta rings used as setters

and another blank circular seal have been found from Dholavira. Such type of seals have been brought to the notice of scholarly world since 1932, as they are distinct from the normally occurring square stamp seals. Similar circular seals with Harappan style motifs and script have been previously known from the sites of Mohenjo-daro, Chanhudaro, Bahrain and Susa. In addition to these type of circular

seals with Harappan script, another type of circular seals now termed as Dilmun or Bahrain type of seals are also found, in particular from the site of Lothal. Lothal, as it is well known to have yielded a docking yard and is connected with the maritime trade of the Harappans. Thus, the **role of Dholavira Harappans, with such finds like the circular Gulf or Persian type seals, in maritime trade, combined with ceramic types like Black Slipped Jar, normally associated again with maritime trade, is well established.** Further to this is the circumstantial evidence for the supply of carnelian beads to Mesopotamia as attested by the various cuneiform records from 2500 - 1900 BCE. Dholavira, as demon-



strated earlier had been an **important raw material procurement centre and bead manufacturing centre for various types of stones like agate-carnelian, jaspers, and several other beads.**

Another important evidence in terms of ideology is the comparison of two seals, one from Stage IIIA of Dholavira and another from Mohenjo-daro, wherein a person with horned headgear is depicted (a deity?) within an outline of foliage (most probably pipal tree), and a kneeling figure is shown in front. The striking similarity can be found from several examples, here shown along with an example from Mohenjo-daro (Fig. 2.196) and another one depicted on a terracotta cake from Kalibangan (Fig. 2.195). It can be identified that even these sites, widely separated by vast distances share the same sort of ideology due to the depiction of horned headgear person, as an important and probably influential nature.

A circular copper seal belonging to Stage VI and found from Castle is another interesting finding, which dates to the late Harappan phase. This is a solitary find and reminds of the connections between the Central Asian regions of the second millennium BCE, however this needs further substantiation.

Thus, on an overall scale, looking into the evidence of seals and sealings, the latter with multiple levels of bureaucratic evidences, combined with the circular type of seals and extensive bead production at Dholavira, along with other finished products, clearly establishes itself as a prominent centre for trade, both inland and external regions. Thus, **Dholavira represents itself as an important centre of culture, involved in interregional trade and cultural interactions, during the third millennium BCE.**

2.A.xvi.c Stoneware Bangles

The stoneware bangles found from several Harappan sites ever since the first excavations at Harappa and Mohenjo-daro are extremely rare and important due to their “unique technological features and micro-inscriptions” (Blackman & Vidale: 1989). Blackman & Vidale (1989) describes “stoneware” as “.....*highly siliceous partly sintered, homogeneous ceramic body usually free from inclusions or voids visible to the naked eye, and characterized by very low porosity*”. The stoneware bangles were “...*produced in two basic varieties – one fired in a strongly reduced atmosphere, assuming colours ranging from pinkish-grey to black, and others from reddish shadows resulting from partial re-oxidation*” (Blackman & Vidale: 1989). Halim and Vidale (1987) describes in detail on the mechanism involved in the production of these stoneware bangles based on the evidence obtained from surface reconnaissance from Mohenjo-daro. The remains from Mohenjo-daro consisted of slags, kiln wasters and a sophisticated double container system (Halim and Vidale: 1987).

The chemical analysis of nearly 60 samples from stoneware bangles and terracotta saggars from Harappa and Mohenjo-daro by Blackman and Vidale (1989) indicated two distinct chemical compositional groups. The chemical analysis also enabled to conclude the stoneware bangles were being manufactured separately



at Harappa as well as Mohenjo-daro. Even though Black and Vidale (1989) points out the very small number of samples, they conclude based on the analysis that “.....production/distribution picture that indicates production at both sites, but with a unidirectional distribution system from Mohenjo-daro to Harappa”. The stoneware bangles are often represented by very few numbers from excavations and found mostly during the mature Harappan phase. The picture from Dholavira is also not different and only 108 fragments could be found from the artefact collection, out of which 17 seems to be terracotta rings that formed support or base of the containers in which the stoneware bangles were baked. The Dholavira collection of stoneware bangles contains a range of colours, from light grey to black, and various shades of reddish orange, indicating their manufacture both under reduced atmospheric conditions as well as partial re-oxidation.

As mentioned above a total of 108 examples were available for analysis to find out the nature of object and it has been observed that out of these, 17 are terracotta rings or bases for the containers and 91 are fragments of stoneware bangles. This constitutes 84.3% stoneware bangles and 15.7% terracotta rings. A total of 57 examples were available for understanding its distribution in various periods and out of these 17 (29.8%) falls in Stage IV, while 27 (47.4%) in Stage V and 13 (22.8%) in Stage VI. The large percentage, i.e., almost 77.2% of the evidence from mature Harappan phase indicates the preference of these bangles or knowledge of production of such extremely sophisticated items. The evidence obtained from Dholavira, clearly place it among Harappa and Mohenjo-daro in terms of sophistication of technology. The circumstantial evidence in the form of terracotta rings clearly indicate the possibility of production of bangles at this site. The arrangement of canisters, terracotta rings and other arrangements from the site of Mohenjo-daro has helped in the understanding of the production technology of these type of highly sophisticated bangles. The analysis of bangles from Harappa and Mohenjo-daro also indicate the production centres from these locations only, and now the evidence from Dholavira clearly demonstrate the possibility of the third production centre. The analysis of clay samples from Dholavira may definitely answer the questions related to provenance of these bangle items.

Thus, Dholavira provides evidence of a craftsmanship, which was purely elite in nature and catered to the needs of a particular section of the society only, as also indicated by the micro-inscriptions on a few bangles.

2.A.xvi.d Stone Artefacts (architectural, sculptures and others)

The excavations at Dholavira brought to light a wide variety of stone artefacts, consisting of hitherto unknown pillar members (even though similar varieties have been found from the site of Harappa and Mohenjo-daro, their manufacturing processes and exact function was unknown), sculptures, drain elements, free standing pillar elements (also ritualistic), bowls, various architectural elements. The plentiful raw material resources in the island of Khadir helped in a major way for the Harappans at Dholavira to experiment and manufacture various sophisticated and aesthetically beautiful stone architectural members, that were ultimately exported to the sites of Harappa and Mohenjo-daro. The scientific analysis of



these raw material resources by Randall Law (2011) has helped in understanding their provenance from near the site of Dholavira on the Khadir island itself.

The south reservoir 3 was in particular excavated partly rock cut, and wherever the rock formation was poor, it was replaced in the form of highly finished stone blocks, often resembling bricks and also given a lustrous look so that they could neatly fit into the desired places. Thus, the evidence indicates that the Harappans at Dholavira, utilised the raw material resources to the fullest extent possible for manufacturing the basic stone blocks for constructions in sophisticated rock cut reservoirs, roughly finished stone blocs for use in the fortification, house blocks and to the highly sophisticated pillar elements used in the East and North Gates, thus providing a crucial evidence for its context and actual usage. The pillar elements found from Harappa and Mohenjo-daro could not help in the real understanding of the context, and hence the *in situ* preserved stone elements, consisting of a series of arrangement of square, bi-concave and bi-convex pillar elements, fastened to each other through a mortice and tenon arrangement, have helped in the understanding of architectural edifices and their basic elements. Further, the excellent evidence of quarrying, fashioning and finishing the pillar elements from a site nearly 3 km northeast



Fig. 2.230: Pillar elements *in situ*, East Gate



Fig. 2.231: Pillar elements *in situ*, North Gate



Fig. 2.232: Standing columns *in situ* near East Gate



Fig. 2.233: Free standing columns *in situ*



Fig. 2.234: Different pillar elements



Fig. 2.235: Pillar elements with concave profile and truncated spherical pillar element



Fig. 2.236: Truncated spherical pillar element



Fig. 2.237: Pillar element with concave profile





Fig. 2.238: Free standing column, with rough base for fixing into the ground

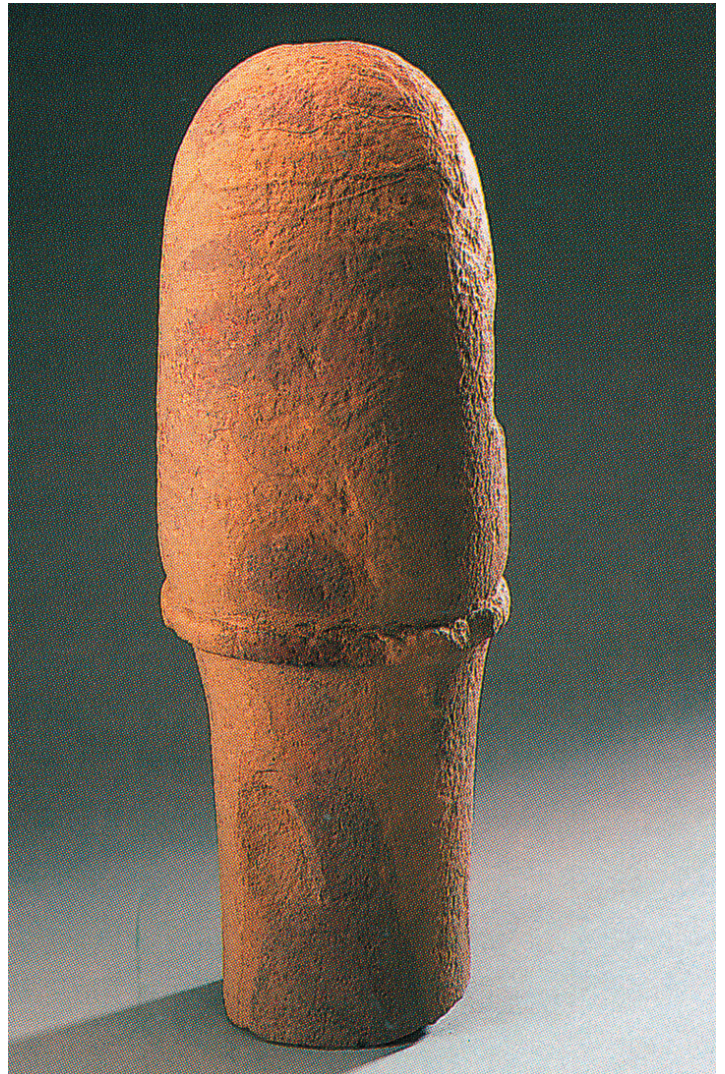


Fig. 2.239: Free standing column, with top portion well preserved



Fig. 2.240: Free standing column *in situ*

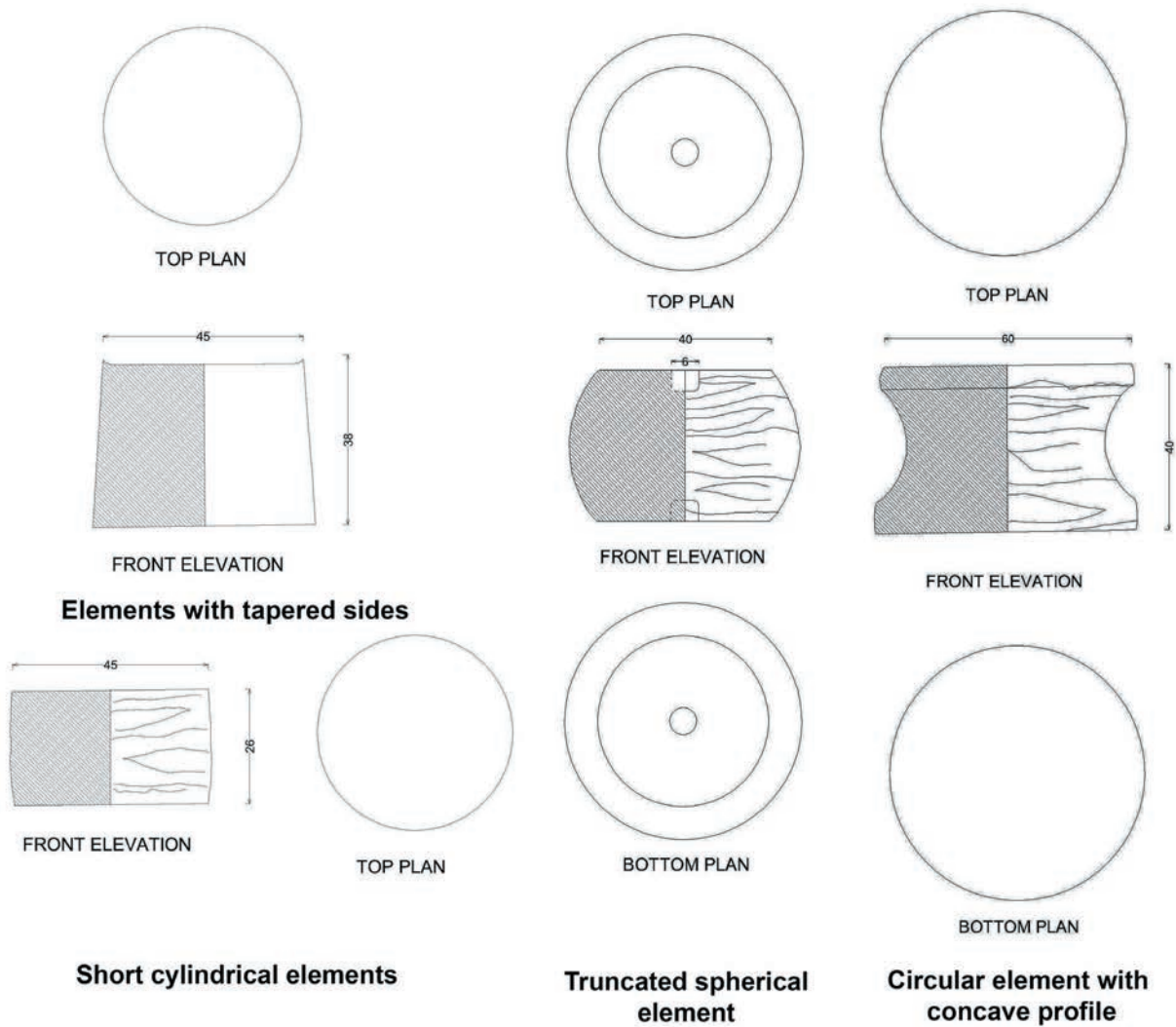


Fig. 2.241: Plan and elevation drawing of different pillar elements



Fig. 2.242: Banded limestone pillar element from Mohenjo-daro



Fig. 2.243: Banded limestone pillar element from Harappa

of Dholavira is the most important contribution for carving such pillar elements. The pillar elements were also exported to other Harappan cities like Mohenjo-daro and Harappa, from where evidences clearly indicate the



interregional trade and the demand for such items of trade, most probably for elite use.

Square elements

The arrangement of pillar elements was in such a manner that over the basal slab was placed a square block, which is also manufactured with the locally available banded limestone from Khadir Island. These stone blocks were found in a highly smoothened and polished surface. The top surface of some of the square blocks is also provided with two long linear grooves on each on either side as is indicated from the *in situ* ones in east gate of Castle. The square blocks with two grooves on the edges are found along the pilaster sides of the chamber in east gate, while the square blocks, which formed part of the composite column, members are devoid of long grooves and are found placed at the central portion. The square blocks did not make a complete cube as their height is found to be nearly 1/3rd of the length.

Circular elements with concave profile

The next pillar element found on top of the square element is an interesting and highly conceived geometrical shape, which can be defined as a circular element with concave profile. This shape is also quite interesting, as it resembles a pottery ring stand, which was normally used as a stand for large globular pots resting on them. It may be interesting to also note here that a vertical profile of such a pot resting on a ring stand will create an impression of a truncated spherical pillar element resting on a circular element with concave profile. The shape of this pillar element is circle, with a concave profile, the base and top surface being flat with chamfered edges. The concave profile of this pillar element has top and bottom circular discs, the diameter of the bottom is larger than the top surface. Further, the chamfering of the top surface is inclined inwards, while the chamfering of the basal portion is more or less straight. This stone member does not have a mortise hold at the base, while at the top surface a mortise hold of 6 cm diameter is noticed. The lower diameter of the stone member is 62.5 cm while the upper diameter is 60 cm. The height of chamfering at both top and bottom is 5 cm. The overall height of the pillar member is 40 cm while the diameter at the centre of concavity is 48 cm.

So far four complete pillar elements of this type has been found, one *in situ* in the east gate, another one found in a dislodged position in north gate, third one in a secondary context of a lapidary workshop of Stage VI near the west gate of Castle and the last one collected from the exploration from Dhundrimal located at a distance of nearly 3.5 km to the east of Dholavira.

Truncated spherical element

The next in series of the pillar components is a finely shaped and finished pillar element in the form of a truncated sphere. The overall finish and smoothening on the surface of this pillar element as well as the concave profiled one indicates a



mechanised technique of turning them similar to a lathe. This pillar element has a convex profile with a flat top and base.

The overall height of the pillar element 35 cm, the diameter of top and bottom surface is 40 cm while the diameter at the centre is 55 cm. The central portion of this pillar element on the top and base has a mortise hole with 6 cm in diameter. Four examples of this variety of pillar elements are known, two found in a dislodged condition in east gate of Castle, third one from north gate of Castle and fourth one from Dhundrial site. Two more incomplete and unfinished ones of this variety are also found placed on either side of the passageway of north gate of Bailey.

Elements with tapered sides

This is a solid pillar element with tapering sides, the basal diameter being larger



Fig. 2.245: Banded limestone pillar element *in situ*, Quarry site



than the top diameter. One such pillar element is of particular interest, which has a height of 82 cm with a top diameter of 35 cm and a basal diameter of 45 cm. This example is of a yellowish limestone and was found from a secondary context in a bead workshop of Stage VI. This workshop was excavated near the west gate of Castle. In this workshop, along with this pillar element, other two pillar elements are also noticed, one of the concave profile circular and other of short cylindrical element. The fourth one is a large stone slap, rectangular in shape and could have been a door-sill.

Short cylindrical elements

Another variety stone elements are a short cylindrical in shape, however with a gentle inward tapering. An example of this kind of element was found in a sec-

Fig. 2.244: Panoramic view of the quarry site with clusters of working areas for each pillar element, stone member and other artefacts

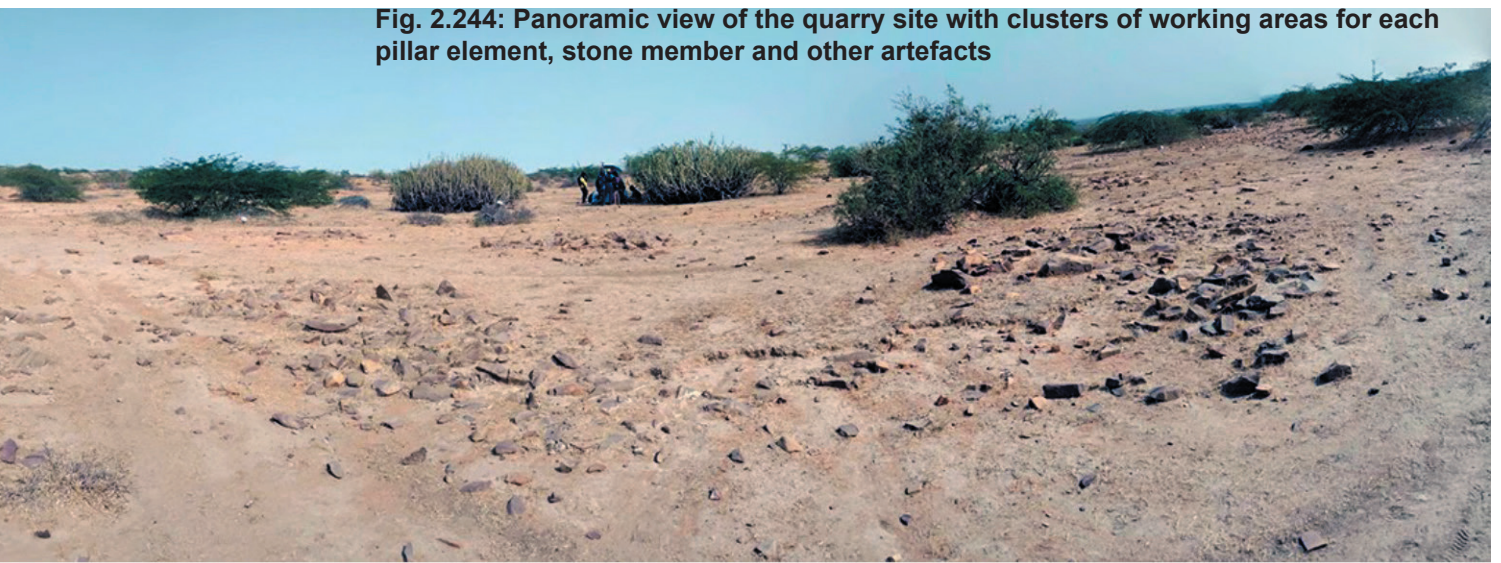


Fig. 2.246: Banded limestone pillar element in situ, Quarry site





Fig. 2.247: Banded limestone pillar element *in situ*, Quarry site



Fig. 2.248: Working areas, Quarry site



Fig. 2.249: Stone sculpture *in situ* near East Gate



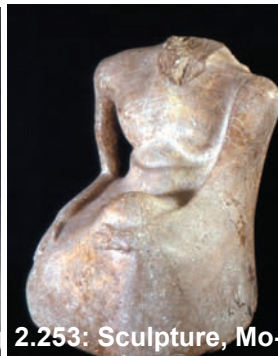
Fig. 2.250: Stone sculpture *in situ* near East Gate



Fig. 2.251: Stone sculpture, Dholavira



2.252: Priest King
Mohenjo-daro



2.253: Sculpture, Mo-
henjo-daro



Lime

(yellow)

Banded lime

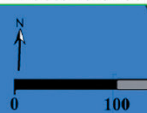
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y-brown banded)

Limestone ringstones at Harappa

ured, yellow-brown often banded
estone is found during Period 3C at
ostly in the form of debris either
or related to the manufacture of
e the ones pictured below. Although
ot found in stratified contexts, they
Harappan design, albeit more typical
ringstones found at Mohenjo-Daro.



stone ringstone
Mohenjo-Daro

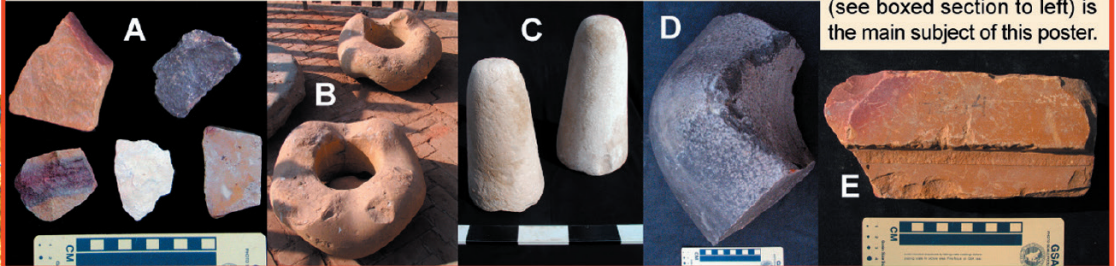


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Limestone at Harappa

Five main varieties of limestone (A) are found at Harappa. Early residents of the site used these to a limited degree to make small objects - the earliest cubical stone weight at Harappa, found in Kot Diji Phase levels, is made of limestone. Generally speaking, however, it is a material that was mostly used during the latter part of the urban phase (Period 3C) to create objects that were relatively large in size such as "ringstones." The "wavy" ringstones of Harappa (B) are made of a light yellow micritic variety. Some large cones or "lingams" (c) are made from a white porcelaneous limestone found in Baluchistan and southern Sindh. Ringstones and large blocks of purlish gray (D) to red colored sandy limestone (or calcareous sandstone) have been found in Period 3C levels, as have such artifacts made from a bright yellow and red variety that has been called "Jaisalmer stone" (E). A fifth variety that is sandy textured, yellow-brown and often banded (see boxed section to left) is the main subject of this poster.



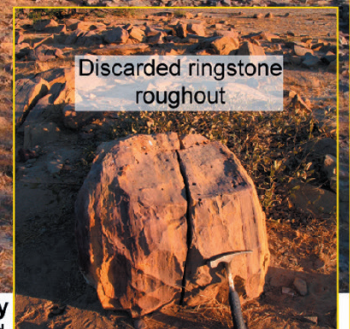
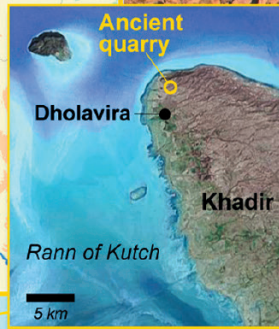
Jaisalmer Limestone



Jaisalmer, in western Rajasthan, is known as the "Golden City" due to the use of local brightly hued yellow limestones for its buildings and walls. When encountering artifacts made of similar looking material at Mohenjo-Daro and Harappa, past excavators used the term "Jaisalmer" stone to describe them. Jurassic limestones in this part of Rajasthan are quite variable and some of them also resemble the yellow-brown banded Harappan types. For this study, samples were collected from four locations within a 45 km radius of Jaisalmer Fort.



Ancient limestone quarry on Khadir Island, Kutch



Khadir quarry

An ancient limestone quarry is situated 3km north of the Harappan site of Dholavira on Khadir Island. Much of the stone used to build that city appears to have been obtained there. Debris, unfinished slabs, and discarded ringstone roughouts are found on the quarry's surface. A visit to collect samples for this study was arranged by Dholavira's excavator Dr. R.S. Bisht.



ondary context from the lapidary workshop near the west gate of Castle. As mentioned elsewhere, this element was found along with other two pillar elements. The short cylindrical element is 38 cm in height and due to its tapering nature, the base diameter is 50 cm and top diameter is 45 cm. The exact function of this element is not clearly understood as it is not found *in situ* condition.

Disc shaped elements

The disc shaped element is another kind of pillar element found from Dholavira, again not in a primary context and only in secondary context. This element is a short cylinder with straight sides. The example available is of a banded lime-stone, 25 cm in height with basal and top surface diameter is 45 cm.

Drain elements

Drain elements are stone blocks, often one long rectangular stone block of lime-stone that have been scooped on one face to create a channel that can serve as a drain channel. Often two or three such rectangular channel elements were joined together to produce a long drain that emanate from house blocks and important areas of the city. These drain elements were later covered by small flat stones on the top to conceal them.

Free standing columns

At least six examples of freestanding columns were discovered from the ex-



Figs. 2.254 to 2.257: Stone bowls of different raw materials





Fig. 2.258: Stone bowl



Fig. 2.259: Chlorite stone vessel of intercultural style

cavations. These freestanding columns are tall and slender pillars with circular cross-section and with a top resembling a phallus or they are phallic in nature. That is why most of them were found in an intentionally damaged and smashed condition. The phallus is depicted realistically with even the drawing of foreskin shown clearly. Two of these freestanding columns are found near eastern end of high street of Castle. These columns measure nearly 1.5 m in height and are found at the strategic location of entering into the high street from the east gate of Castle. These two columns are placed in such a manner at the beginning of high street that divides the street into three equal parts. The other freestanding columns of the same variety and typology, numbering into four was found in a completely smashed and broken condition. Two of such columns were found in a secondary condition, fitted as a masonry I subsequent structure. One such column was found embedded in a masonry of Tank A while the other one was found

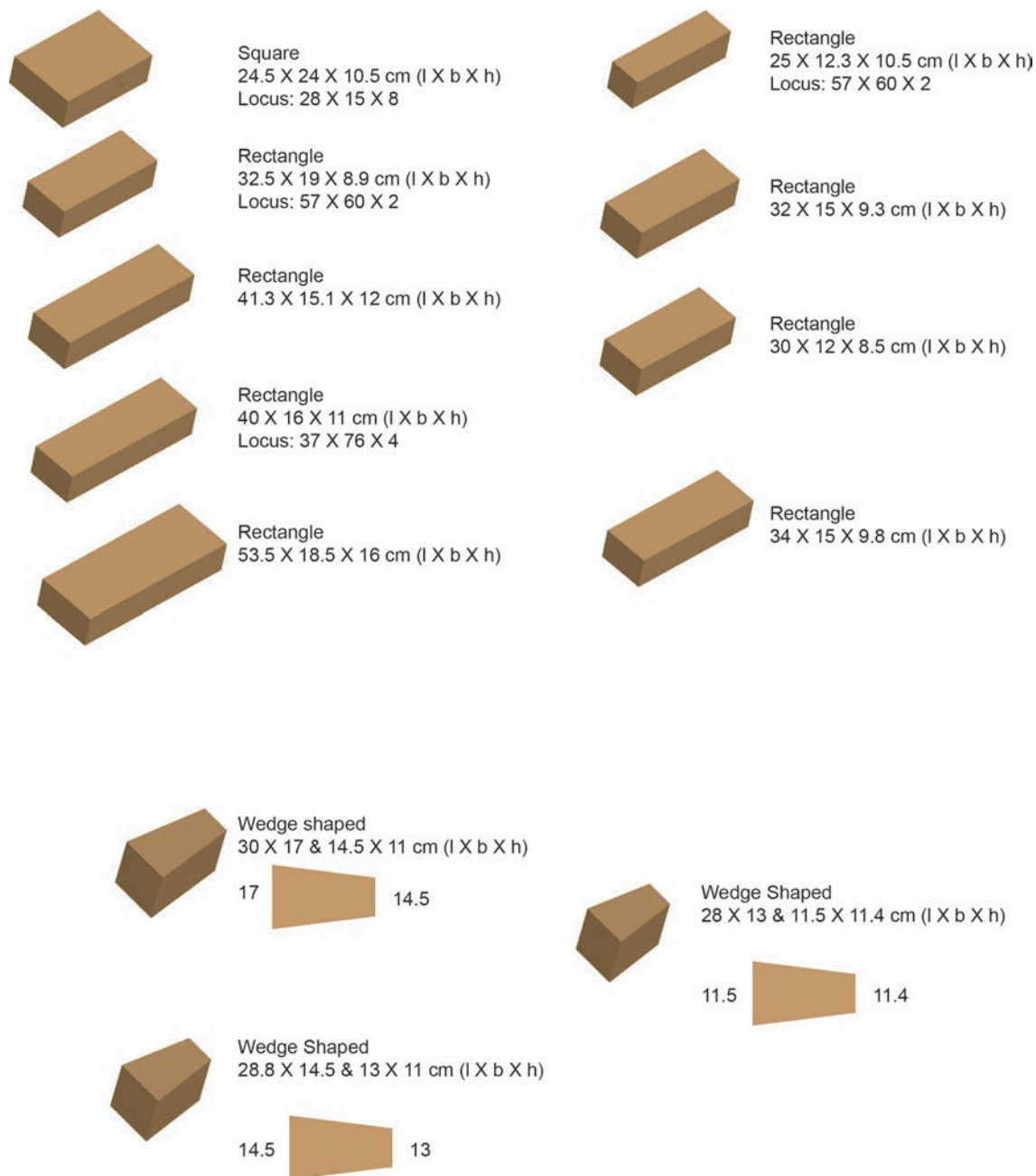


Fig. 2.260: Different dimensions of stone blocks found from Dholavira





Fig. 2.261: Stone blocks used in the filling of irregularities in the bedrock of South Reservoir 3



Fig. 2.262: Examples of stone blocks

in a masonry in a later period structure near the western fortification of Castle. Two more examples, completely smashed and destroyed ones were also found, one near the western end of Ceremonial Ground and the second one near the north gate of Castle. The destruction and desecration of these columns can be equated with that of the damage caused to the stone statue, which clearly indicates a change in ideology and traditions, customs after the Harappan phase. The exact nature of the two free standing columns to the east of high street is also not ascertainable and it is also difficult to determine whether they are in their primary or secondary context. Interestingly all these stone columns have a roughened and irregularly chipped bottom which is a clear indication of burying them up to the irregular portion so that polished and highly finished upper portion can remain above the ground.

Stone sculpture

The Dholavira statue is perhaps the largest that Harappans ever attempted (Fig. 2.249 - 2.251). It was found placed upside down as a building block of a wall that was raised by the late Harappans to retain the tilting and bulging northern wall of the passageway of east gate of Castle. It is made of porous limy sandstone with weak matrix. It was in a seating position with a flat base, arms resting on the knees, with both the knees drawn up and kept apart as if to show the genitals as the sculpture has shown no feature of clothing. The statue depicts a male individual and its execution is close to realistic. The belly is shown protruding. The rear portion of the statue also shows evidence of depiction of hair lots falling down, which is also damaged. It was certainly vandalised, possibly just like all the statutes, which were found in Mohenjo-daro. The genitals were intentionally rubbed off and damaged. A mould was prepared of this statue and a cast was prepared which clearly indicated the closure details of even the genitals. It also clearly indicated the rubbing off of the genitals intentionally while the other details of genitals were clearly visible. It suggests that it was related to phallus worship, which is nicely corroborated by quite a few finials of pillars with carving in the shape of phallus.

The head portion of this statute is missing now. It seems that its head was intentionally chopped off, elbows and knees are also considerably damaged. The intentional damage caused to this statute may be a clear indication of the paradigm shift in religious belief and ideology, most probably belonging to the mature Harappan phase as this statue is found from a secondary context belonging to Stage VI. The manner in which the statute was damaged clearly indicates that the role played by it could no longer appreciated by Stage VI occupants. The depiction of nicely cut inscriptions on the seals of Stage VI, but without any motif may also indicate a departure of beliefs and customs. It is interesting to note that the seating posture of this sculpture bears close resemblance with the so called 'Priest King' found from Mohenjo-daro and another seated stone sculpture from the same site. The similarity and rarity of such sculptures from such Harappan sites clearly indicate the same kind of ideological importance attached to such sculptures, thereby indicating a clear exchange of ideas, values, customs and traditions.



Stone vessels

Another interesting item of stone artefacts is the shallow bowls carved out of several soft stones like the limestone, sandstone and fossiliferous limestone (Fig. 2.254-2.257). These vessels are very rare and only a handful of them have been recovered from the excavations. The exact function of these bowls is yet to be ascertained. However, from the nature of these artefacts and the extreme sophistication in which they have been manufactured indicates its special importance and elitist in nature and character. They have been manufactured from the locally available stones that are present aplenty in the surrounding areas of Dholavira. A few of these bowls are also highly polished to give a smooth surface and presents a pleasing look and appearance.

Chlorite stone vessel

Two fragments of the chlorite vessels of the intercultural style have been found from Dholavira (Fig. 2.259). These chlorite vessels are found in a wide area spreading across Mesopotamia, Elam, Central Asia and Indus Civilization. These vessels are believed to have been manufactured in eastern Iran or Bactria (Afghanistan) and found to be traded over vast distances. Such chlorite vessels have been reported from Susa (Iran), Ur (Mesopotamia) and from a few sites in Persian Gulf region also. These vessels are normally dated to the second half of third millennium BCE and are also decorated elaborately in certain cases. The two findings of such vessels from Dholavira belong to Stage VI, one each from Middle Town and Castle.

The first one is a fragment consisting of circles and wavy lines emanating from it. The second one is a broken fragment of a small vessel rectangular in shape, the fourth side on the breadth side is broken. Each face of the vessel has a decoration of circle with a dot inside a rectangular field. Such findings, in addition to the already mentioned items of trade like agate-carnelian jewellery, Indus type circular seals, clearly indicate the role played by Dholavira in the interregional trade mechanism, with west Asia and Persian Gulf regions.

Masonry Blocks

There are examples of innumerable number of stone masonry blocks of various sizes and shapes that were used in the construction of different edifices (Fig. 2.260-2.262). Some of the blocks are still *in situ*, the best examples being the structures in Middle Town and South Reservoir 3. The shapes of these masonry blocks include square, rectangle and wedge-shaped. The wedge-shaped blocks are a clear indication of its use in circular structures, most probably wells. These masonry blocs were manufactured with the locally available limestone. The enormous quantity of bedrock removed while construction of a series of reservoirs could have been effectively utilised for manufacturing these blocks. The South Reservoir 3 preserves some of the well-preserved and manufactured stone masonry blocks, which even resembles baked bricks in terms of its execution.



2.A.xvi.e Weights and Measures

One of the hallmarks of the Harappan Civilization is the weights and measures and their standardisation achieved throughout the length and breadth of its territory. The earliest excavations at Harappan and Mohenjo-daro during the beginning of last century brought to light among all classical elements of the Harappan Civilization, a distinct and highly developed and standardised weighing system. A.S. Hemmy was one among the earliest scholars to have a detailed account of weights from Mohenjo-daro (1931) and Chanhudaro (1943). Later, M.S. Vats (1999) gives an account of the weights found from the excavations at Harappa. Hemmy (1931) summarizes his approach of finding the probable value of the unit as follows:

“...the weights fell into a series of groups which were in simple numerical ratios with one another. Giving the smallest the arbitrary value of unity, the others are in simple ratios, 2, 4, 8, etc. The mean weight of each group is divided by this ratio and multiplied by the number of specimens. The products for all the groups are added together and divided by the total number of specimens. This gives a mean value for the group of smallest weight in which every specimen weighed is allowed equal importance. The mean values for all the other groups are then obtained by multiplying this mean value by the ratio already found...”

Hemmy (1931) identifies two series at both Harappa and Mohenjo-daro and also concludes that there is ‘...no local variation between the weights in the two places, although 500 miles apart.’ Hemmy (1931) also notes that the sequence of ratios is striking which runs as 1, 2, 4, 8, 16, 32, 64, 160, 200, 320, 640, 1600, and concludes the absence of sexagesimal system and all ‘...ratios are binary or decimal.’ Hemmy (1931) also observes the various possibilities of arriving at the weighing system based on the weight of grains such as wheat, barely, *ratti*. Hemmy (1931) finally concludes that the mean value of the most commonly occurring weight is of ratio 16 and weighs 13.71 gm at Mohenjo-daro. Hemmy (1943) later on the analysis of a large number of weights from Harappa, Mohenjo-daro calculates the ‘Mode’, or value of maximum frequency to be 13.625 gm.

996 specimens were identified from Dholavira as weights and subjected to detailed examination; documentation and same were listed 8.3.3. Those included all such specimens, which have already been given specific designations by Hemmy. Apart from them, there remained many, which did not fit in any definition of an object, or use, or form. Those have been designated as amorphous. All of them were marks of modification by rubbing different sides so that those could conform to a unit of weight. Most interestingly, those were shell pieces as fragmented bangle or industrial waste, besides like pieces of stone made into weight by rubbing. Since all the weights were giving bafflingly continuous count of numerals in terms of weight value, first of all those were selected which were conforming to the unit weight of Hemmy’s system. Before that upper & lower limits in case of each was calculated by allowing 5% deviation plus or minus of mean weight.

Furthermore, there were found many weights, which were lesser in value than



those listed, by Hemmy and other excavators. In the process many missing links in the previous series also got filled up. This series was given designation A. Another set of series of weights, which have been often described as aberrant weights from other excavated sites were also studied and correlated with the assumed ratios of Dholavira and a separate series named as B was designated to this category of weights. It has been observed that this series of weights is also hexadecimal. All the remaining weight both the series were studied the fresh in view of the calculated lowest unit value. It was found that in both A and B, there

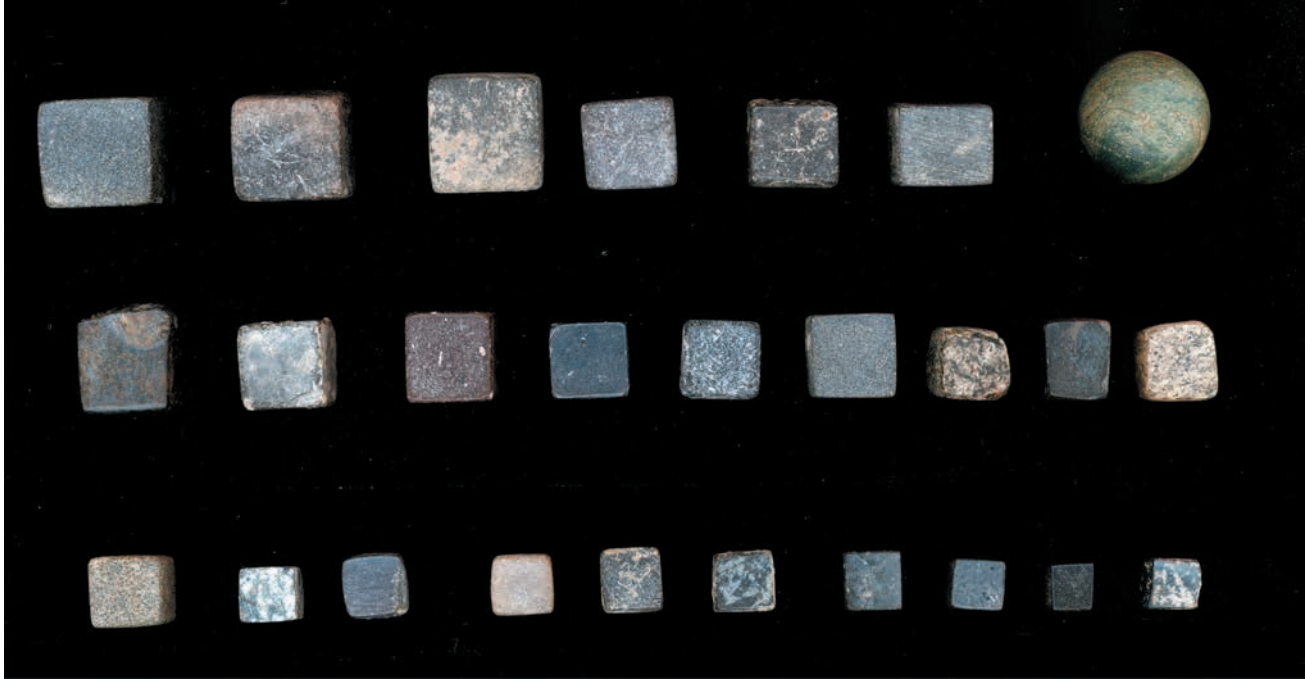


Fig. 2.263: Cubical weights of various materials



Fig. 2.264: Cubical and truncated spherical weights of various materials

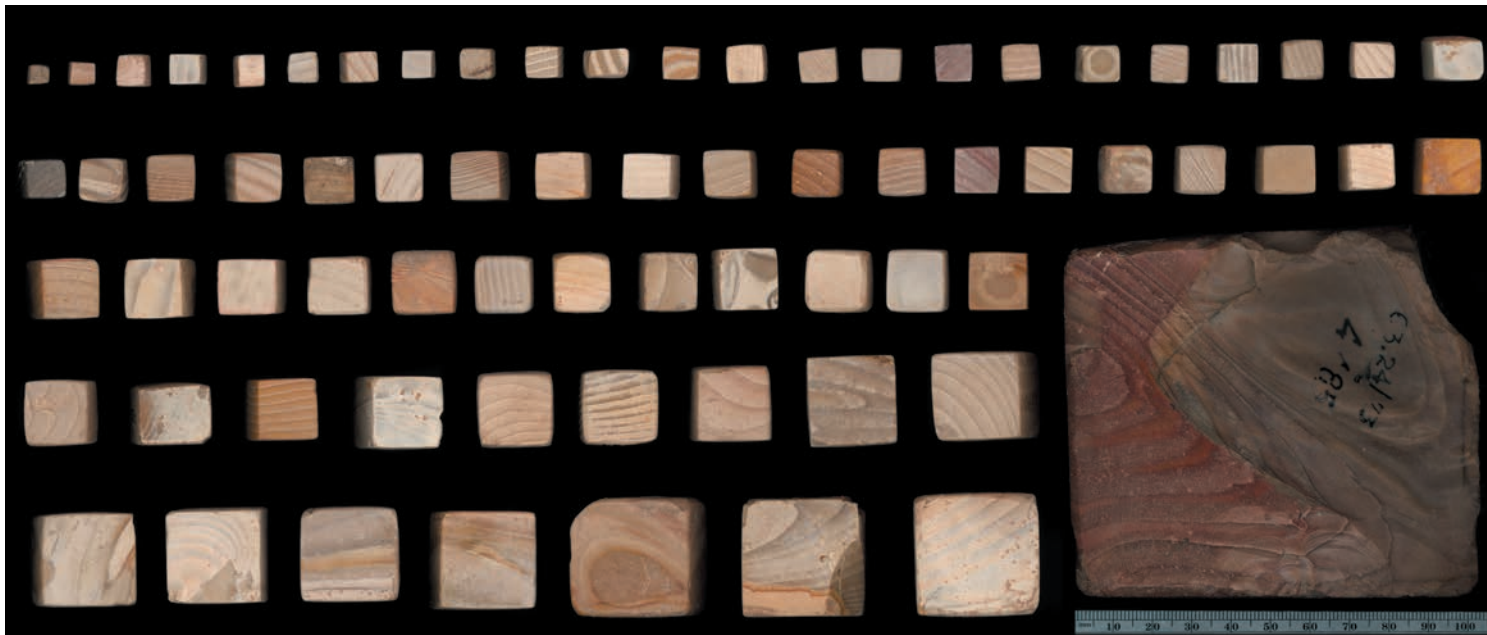


Fig. 2.265: Cubical weights of banded Rohri chert



Fig. 2.266: Weights of basalt (?) and sandstone

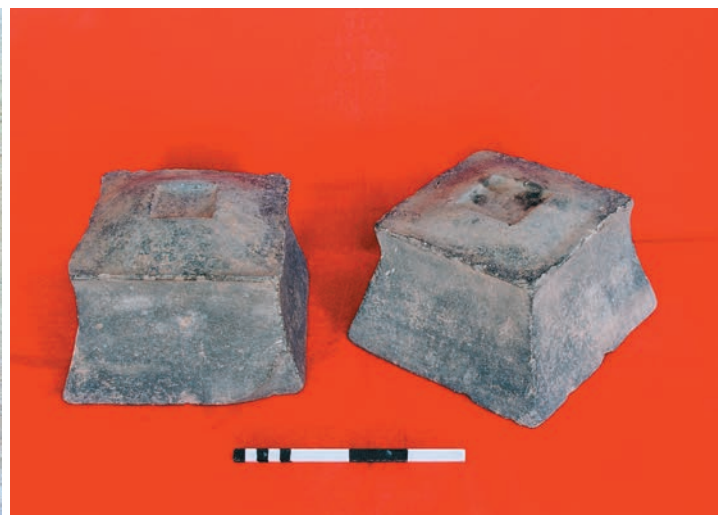


Fig. 2.267: Weights of basalt (?)



Fig. 2.268: Weights of various materials



Fig. 2.269: Weights of various materials





Fig. 2.270: Weights of various materials



Fig. 2.271: Cubical and truncated spherical weights of chalcedony



Fig. 2.272: Cubical weights of banded Rohri chert



Fig. 2.273: Weights of shell



Fig. 2.274: Cubical weights of banded Rohri chert

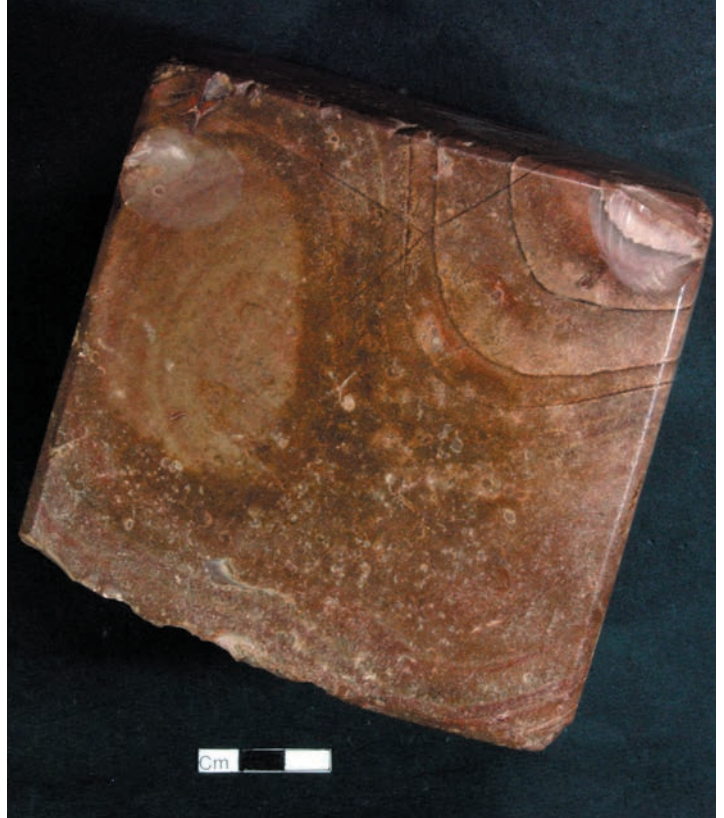


Fig. 2.276: Cubical weights of banded Rohri chert



Fig. 2.275: Weights of various materials

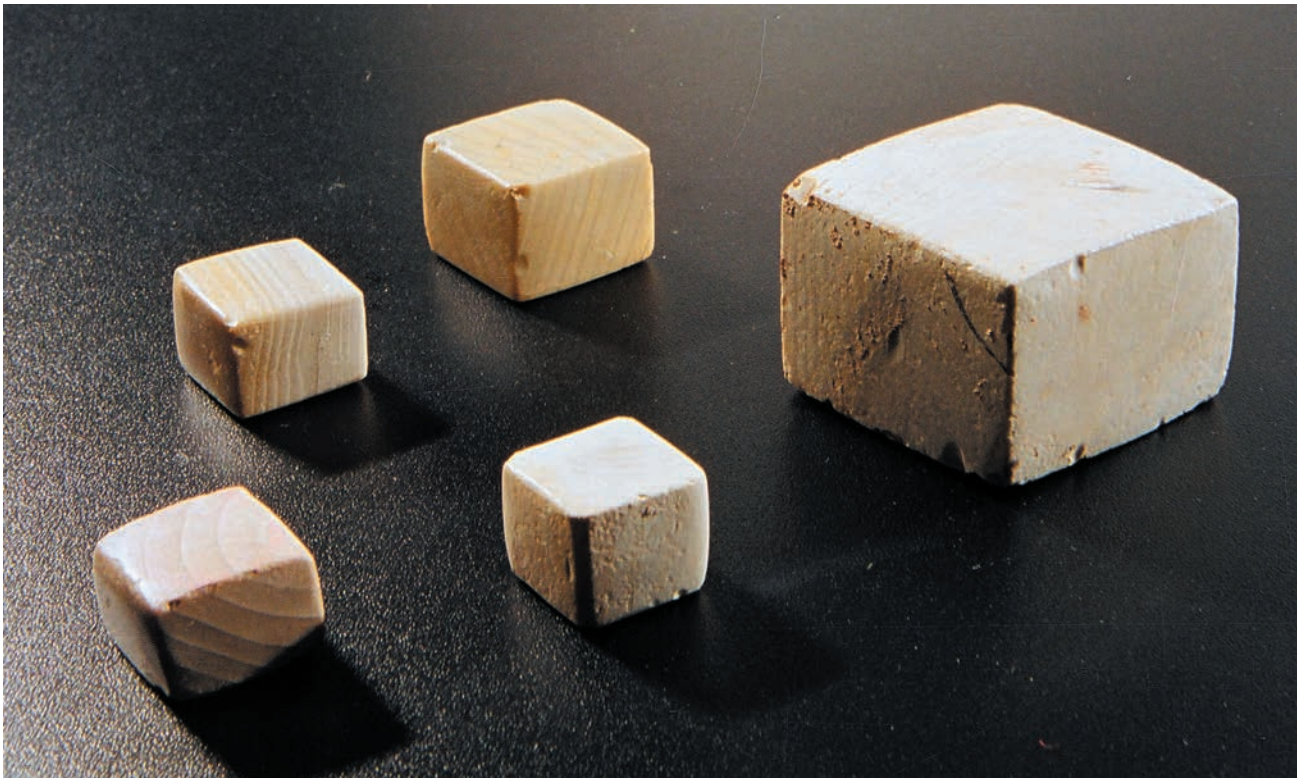


Fig. 2.277: Cubical weight of banded Rohri chert

were two subsidiary series which were rather decimal that is base ten. Thus have emerged two series in A, called A 1 and A 2, both related to each other, likewise B series was also subdivided. Apart from the typical cubical chert weights of the Harappan typology, several other shapes were also encountered from the Dholavira collection, which on analysis fell into one of the weight series. The following is the nomenclature adopted for describing various shapes of the weights from Dholavira:

Sl. No.	Type	Description
1	Amorphous	Devoid of any definable shape, often squarish or rectangular in appearance. Can be equated with the kind of unusual shaped weights in the local markets and bazaars.
2	Bar	With rectangular cross-section
3	Barrel	Barrel shaped
4	Bi-convex	Convex profile on both the sides
5	Conical	Cone-shaped
6	Cuboid	Cube shape with or without rounded edges
7	Cylindroid	Cylindrical shape
8	Discoid	Resembles a flat disc
9	Domical	With a domical top
10	Hemispheroid	Hemispherical shape



Sl. No.	Type	Description
11	Lentoid (beady)	Lenticular shape
12	Ovate	Oval in shape
13	Pebble	River pebbles flattened on one side for stability and in some cases chipping done to conform to the weighing system
14	Plano-convex	Plano-convex in shape
15	Prismatic	Prism shape
16	Pyramidal	Shape of pyramid, with flat top and base
17	Spheroid	Spherical in shape
18	Tabloid	Tablet-shaped
19	Trapezoidal	Trapezoid-shaped

A total of 996 weights were available for this analysis and the cuboid shape dominates the most with 393 (39.5%) followed by spheroid (124, 12.4%), cylindroid (91, 9.1%), discoid (89, 8.9%), amorphous (78, 7.8%), tabloid (74, 7.4%), amorphous (78, 7.8%), pebble (46, 4.6%), conical (32, 3.2%), bar (13, 1.3%), barrel (14, 1.4%), pyramidal (14, 1.4%) and other minor varieties which are represented in very small numbers. A comparatively large number of amorphous and pebble shaped weights indicate the adoption of weighing system and transferring it to whatever material available at the disposal. It may also be interpreted that these unusual shaped weights, a departure from the normal cubical Harappan weights, could have been used by a section of population who might not have access to sophisticated and well finished weights. However, it may be noted that these weights also fall into the standardised weight system.

The material-wise analysis of 994 weights from Dholavira has indicated that the most preferred or most number of weights is with shell as the manufacturing material, which constitutes 236 (23.8%) in number out of the total collection. This is followed by other materials like sandstone (148, 14.9%), chert (135, 13.6%), unidentified stone (98, 9.9%), agate (85, 8.6%), terracotta (73, 7.3%), limestone (50, 5%), basalt (29, 2.9%), jasper (26, 2.6%), black stone and copper (21 each, 2.1%). It is interesting to note that a total of 55 materials have been exploited by the Harappans of Dholavira to manufacture the weights, and it is not surprising that shell dominates the entire collection as it could have been the most easily available material in this region due to the proximity of coastal line. The analysis indicates that an overwhelming number of 673 weights are in a perfect condition (68.2%) followed by slightly chipped (203, 20.6%), damaged, which were later omitted for weight analysis (56, 5.7%). A total of 615 weights were available for analysis to know the locality from which they were found. The analysis indicate that a majority of the weights come the Middle Town (278, 45.2%) followed by Castle (189, 30.7%), Lower Town (72, 11.7%), Bailey (43, 7%).

A total of 470 weights were available for understanding their distribution based on the period / stage. The analysis indicates that a majority of the weights, i.e., 183 (38.9%) come from Stage V followed by Stage IV (167, 35.5%), both of which

correspond to the mature Harappan phase at Dholavira. Thus, an overwhelming 74.4% of the weights are from this period, which is a clear indication of the commercial activities. Further, more number of weights from Stage V is also an indication of peak in commercial activities during the later stages of the mature Harappan phase at Dholavira. The weights from Stage VI numbers to 78 (16.6%), which is also a clear indication of the continuation of commercial activities during the late Harappan phase at Dholavira. This also conforms to the site distribution maps during the late Harappan phase, which clearly shows the continuity of sites after the demise of Harappan phase in Sindh and Punjab. The Gujarat region of the Harappan domain could have clearly continued the commercial initiatives of the Harappa phase. The smallest mean weight in Series A1 is 0.083 gm and 0.07 gm in Series A2, while the largest weight is 13,922 and 830 gm respectively. The smallest mean weight in Series B1 is 0.092 gm and 0.296 gm while the largest 6,360 and 12,460 gm respectively. Thus, the evidence obtained from Dholavira indicates the usage of a wide variety of materials, hitherto unreported from other sites and also indicating brisk commercial transactions happening. The different varieties of weights, both cubical and truncated spherical ones, and other varieties indicates an interaction of different weighing patterns and a complex form of commercial transactions. Dholavira, thus has **displayed a unique pattern of different systems of weights, from the very smallest to largest, variety of materials, shapes and sizes, fully attesting the role it played in trade activities.**

2.A.xvi.f Copper objects

Like other Harappan settlements, excavations at Dholavira have also yielded a good number of specialized copper and bronze objects. Typologically they may be divided into five broad categories which included tools, weapons, personal ornaments, objects of domestic use and figures. Although it is difficult to make a hard and fast distinction of certain tools as objects like axe, spearhead etc could be used as weapons of both offensive and defensive purposes. As an industrial and trading community it seems that the Dholavira Harappans preferred to pay much attention to the improvement of tools required by the carpenters, stone workers, copper smiths and lapidaries, than the production of more advanced types of offensive and defensive weapons.

The evidence of copper metallurgy from the earliest stages at Dholavira clearly indicate the smelting of copper ore. The nearest copper sources from Dholavira is the Ambaji-Deri copper mines located on the Gujarat - Rajasthan border. A variety of copper artefacts clearly demonstrate the wide preference of finished products, both for the elite and lay persons.

It has been confirmed that the origin and development of copper metal technology occurred in combination with developments in other technologies. During the 5th to 4th millennium BCE, changes were occurring simultaneously in metal production along with other changes took place in the things like ceramic, drilling in hard stone, beads, shell working etc. Such kind of transitions which happened in Mehrgarh were also witnessed in the highlands of Baluchistan, and other greater Indus regions like Nausharo, Balakot, Ghazi Shah, Rahman Dheri, Kalibangan



etc. All these sites revealed that the use of copper prior to the Harappan phase along with changes in other technologies. Kenoyer believes that throughout southern and northern Baluchistan, Afghanistan and Rajasthan, the combined resources of metal ores and fuel were available to communities of sedentary agriculturists and semi nomadic pastoralists. Such communities were undoubtedly familiar with the properties of ores and how to extract the metal long before it became an important economic process.

Copper as an important cultural element occurs in all the Harappan sites. As told earlier that excavations at Dholavira have yielded a great variety of focused copper and bronze objects. After a careful and analytical study of all these objects tentatively the following variety of tools has been classified that were used by the inhabitants of Dholavira:

- Antimony rod
- Arrowheads with backwards projecting barbs:
- Bangle
- Blade
- Blade axe
- Chisels of both long and short variety
- Circular disc like object
- Fish hook and simple hook of both long and short variety
- Knife with a thin leaf shaped blade
- Nails or Bolts
- Point
- Razor
- Ring, both coiled and simple type
- Rod of different sizes
- Spearhead or Lance head of various sizes with a tang
- Spindle rod

Among all these objects, few items like chisel, arrowhead, rod etc. irrespective of their sizes have been encountered in plenty number, whereas the remaining ones are low to medium in strength. The assemblage shows that they are very typical and has their parallels in Harappa, Mohenjo-daro, Chanhudaro, Kalibangan, Lothal, Rangpur, etc. In course of study it has been found that blade axe, spearhead, knife, chisel and razor are the most prominent ones. As far as the blade axe is concerned, the general slope of their cutting edge is found on the

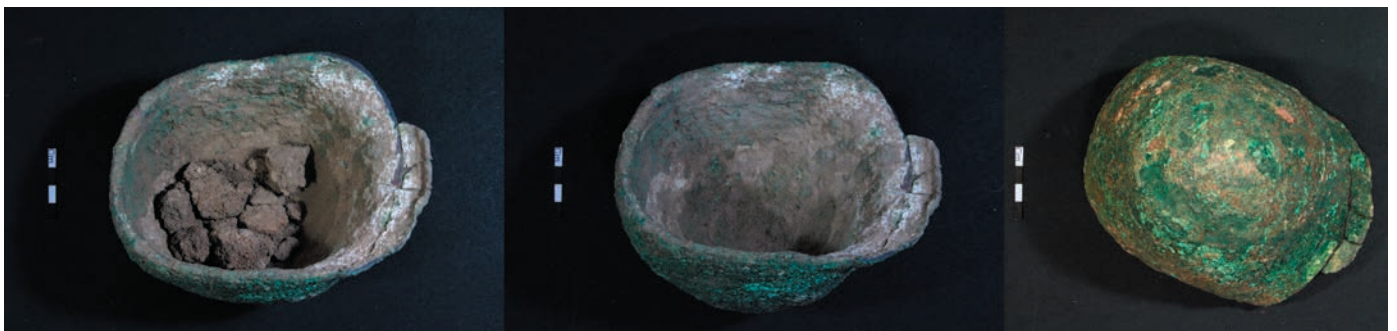


Fig. 2.278: Copper crucible (different views)



Fig. 2.279: Fish hooks



Fig. 2.280: Copper bangles



Fig. 2.281: Artefacts and connections with similar ornaments from other sites



Fig. 2.282: Figurine

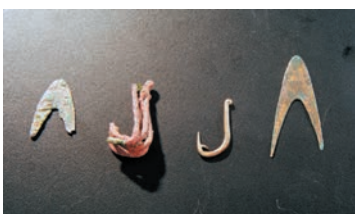


Fig. 2.283: Arrowheads and fish hook

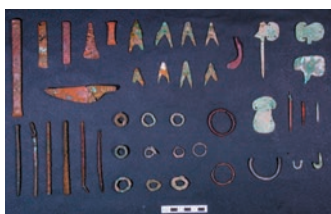


Fig. 2.284: Various artefacts



Fig. 2.285: Weights





Fig. 2.286: Copper pan



Fig. 2.287: Hammerhead

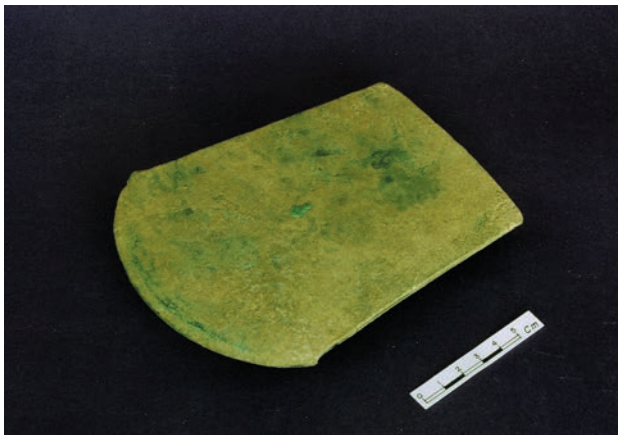


Fig. 2.288: Axe



Fig. 2.289: Chisels, spearhead, arrowheads



Fig. 2.290: Various artefacts



Fig. 2.291: Spearheads

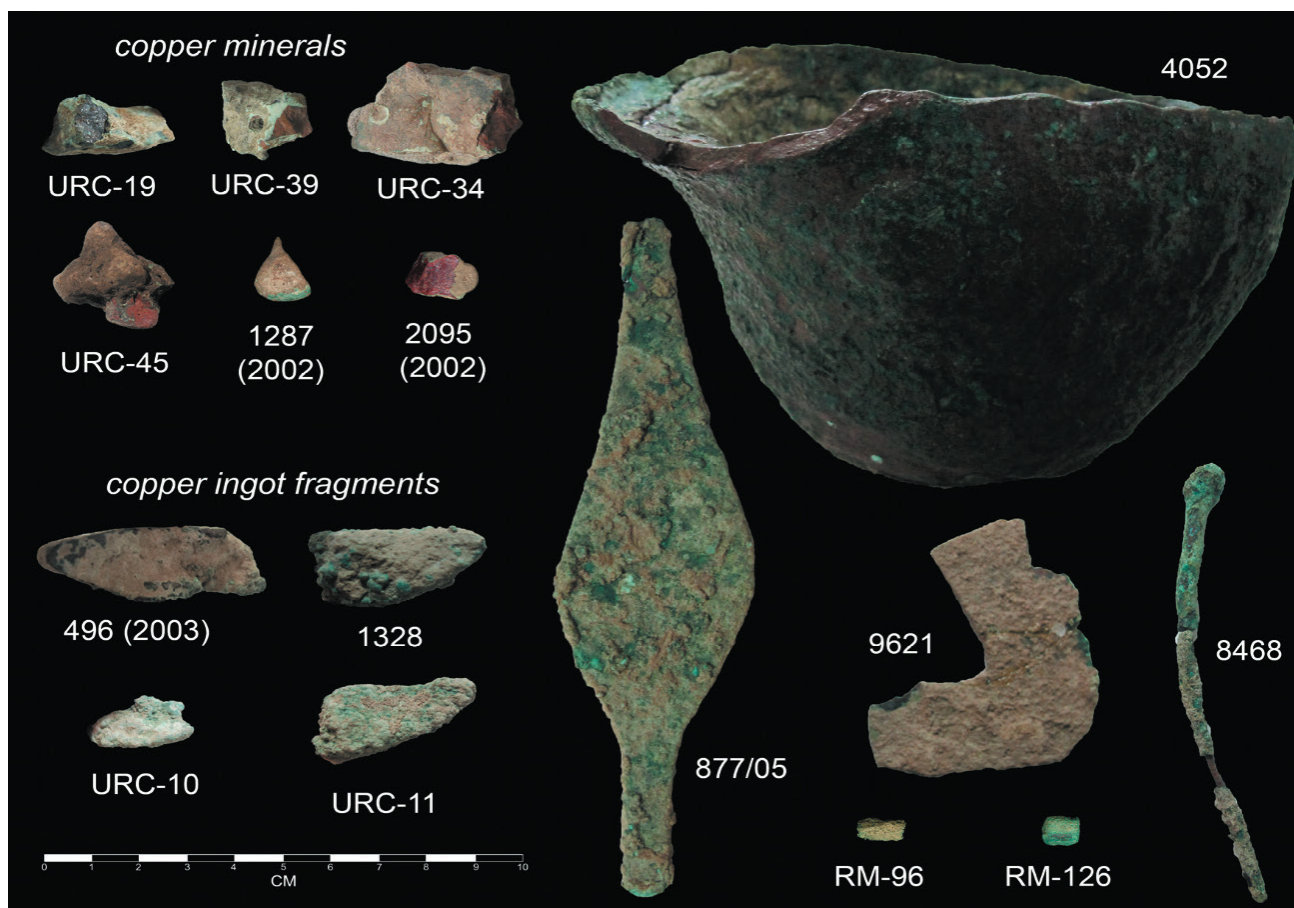


Fig. 2.292: Samples of artefacts and ores for lead isotope analysis

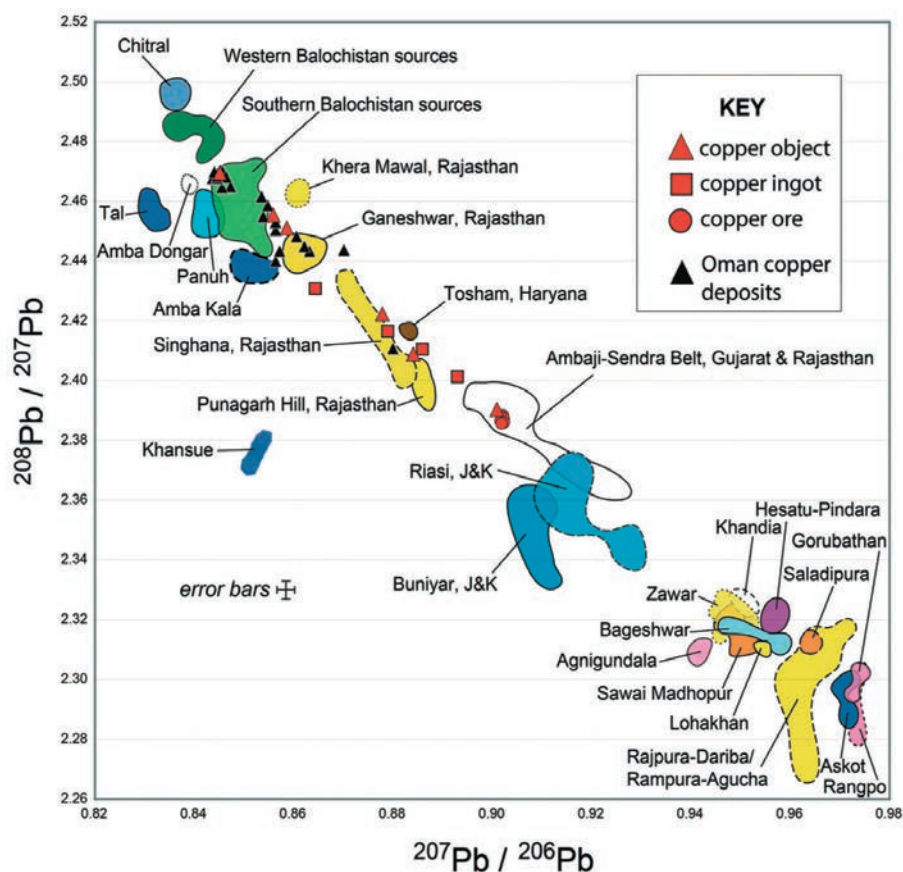


Fig. 2.293: Plotting of lead isotope ratios of copper samples from Dholavira against the ore sources for provenance analysis



both sides and are of mainly two types long and narrow and short and broad, although the later one are more wide in its use.

Their sizes often varies from 3-5 cm. Spearhead or lance head, an important tool that was made from the rod of metals where tangs are thicker than the body. Such kind of tools was perhaps taken into the use of cultivation, like scooping the earth, which requires a solid tang. All these spear heads are mainly leaf shaped, thin, and in some cases the shaft is more slender and elongated in nature, with a dwarf tang, somewhere the latter are found to have missing. They are of various sizes which vary from 19- 26 cm in length with a width of 7-9 cm occasionally. Most interestingly some of the tools bear grass impression.

Razor, another important tool of the Dholavirans, has been classified into double bladed and single bladed sub type. Here blades are always thin in nature whereas the tangs are oval in section and not much thicker. Perhaps they were roughly cut out of sheet metal and the blades are subsequently spread by means of hammer before finally trimmed into shape. Their general length varies from 4.5-17 cm which is the longest one.

Another important tool in this regard that has been constituted an important percentage of the total tool assemblages is the chisel. Mostly they are rectangular or square in section with uniform dimensions along the entire length, beside rectangular or square in section with flattened end also. Maximum chisels are either double sloped or beveled in nature, may be the flattened shanks are meant for fixing the handles. These chisels of various sizes denote their variant uses in respective materials. The pointed one perhaps for cutting stone or for single wood work and smaller ones are for engraving on soft materials like soap stones or on the steatite seals. Their general length varies from 5-10 cm although exceptions are there.

It may be mentioned in this context that most of the tools like knife, chisel, point etc. were fixed in handles and the tang was sometimes thicker than the blade. Even some of them have left their impressions of work that have been taken from them. Regarding, other tool types, fishhook, simple hook, rod, antimony rod, bolt or nail spindle rod, cup shaped object deserve mention, and a few of them have been included in the study. Nails mostly occurred with or without bulbous head are almost broken in nature beside this; personal ornaments like bangles, rings both of coiled and simple type, pendants (only one piece), and few spacers may also deserve mention. Not only this, the site has yielded few animal figurines (presently kept in the National Museum) which will be included in the next phase of study as they will be taken in possession.

Along with these objects **a large number of copper slags and fragments of crucibles have been found that shows the local smelting of copper and its workmanship in Dholavira itself.** Thus the availability of various developed and advanced copper objects clearly indicate the existence of a highly skilled group of copper smiths in the Harappan society who were also responsible for the first urbanization in the Indian sub-continent. In terms of their metallurgical skill it



has been proved that the Harappans possibly knew the smelting of sulphides and copper ores. Further spectrometric analysis of certain copper objects has revealed that they knew the process of alloying, beside the technique of sinking, `rising` running on, cold work, annealing, riveting, lapping, closed casting. It may be mentioned in this context that a good number of metal objects which are presently housed at National Museum Delhi are not only unique in its type and nature, but they represent as few finest specimens of Dholavira.

The analysis of copper, lead and silver artefacts from Dholavira was carried out by Bisht *et al* (2015) through non-destructive EDTA mechanism (dipping the artefacts in ethylene-diamine-tetra acetic acid solution and analysing using ICP-MS technique). Of these, the analysis of copper samples indicates that six copper ores and one artefact (bangle) have its provenance in the Ambaji-Deri in Gujarat, while two ingots and two artefacts leads to Singhana / Khetri ore source in Rajasthan. Analysis of other artefacts and ore samples indicate multiple sources

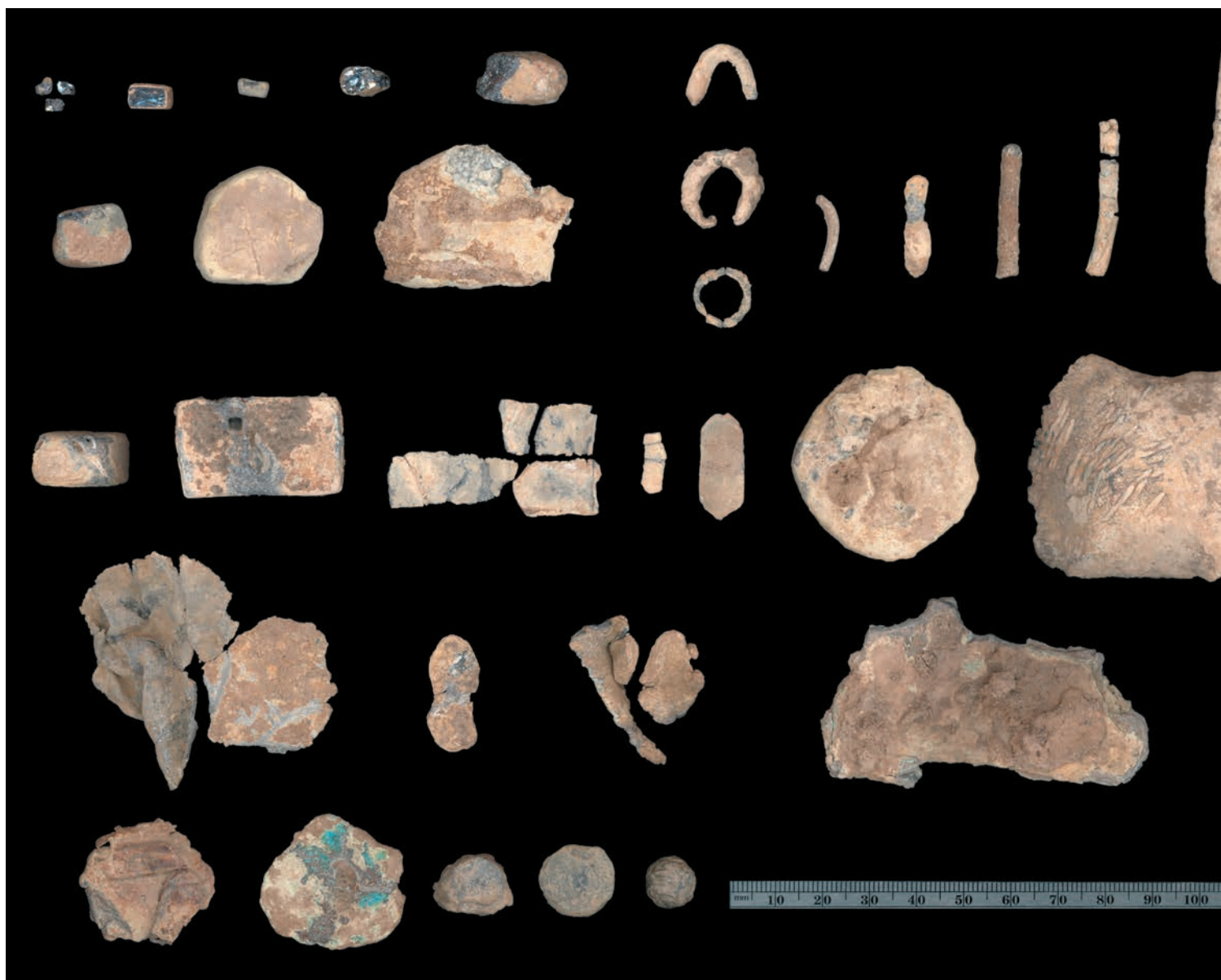


Fig. 2.294: Lead artefacts



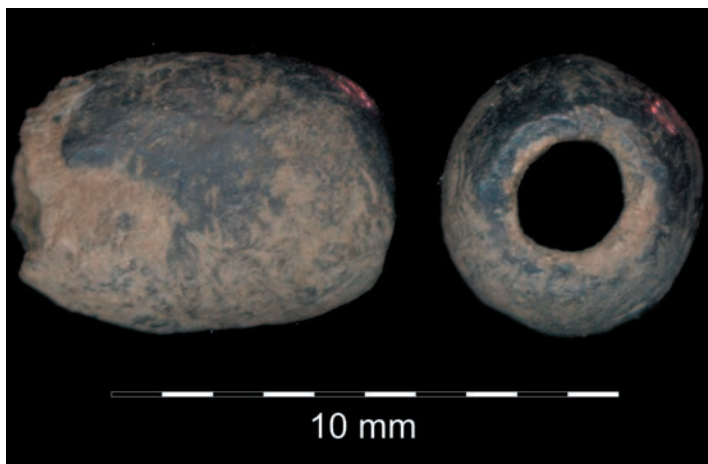
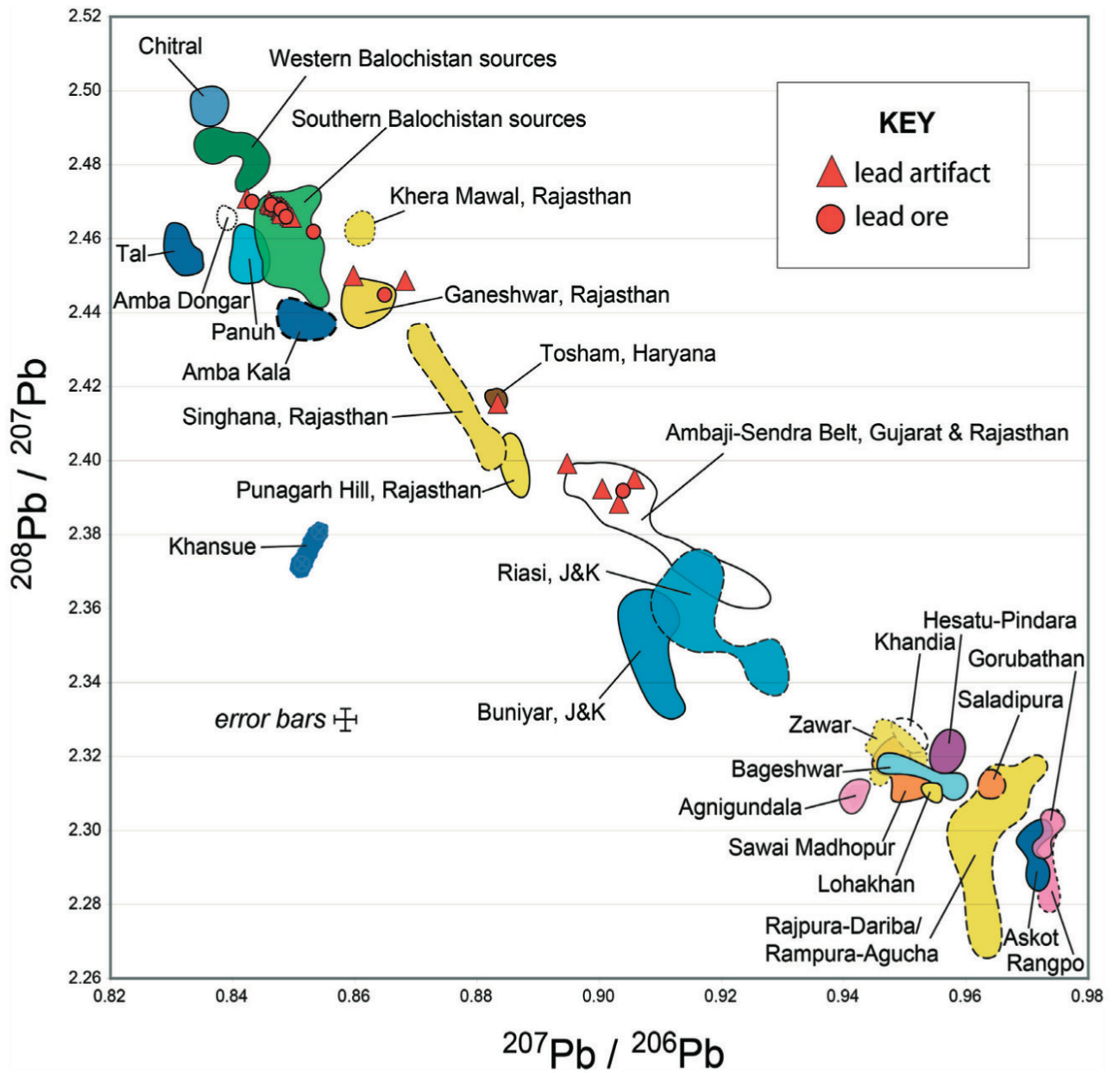


Fig. 2.296: Silver bead



Fig. 2.297: Silver coil

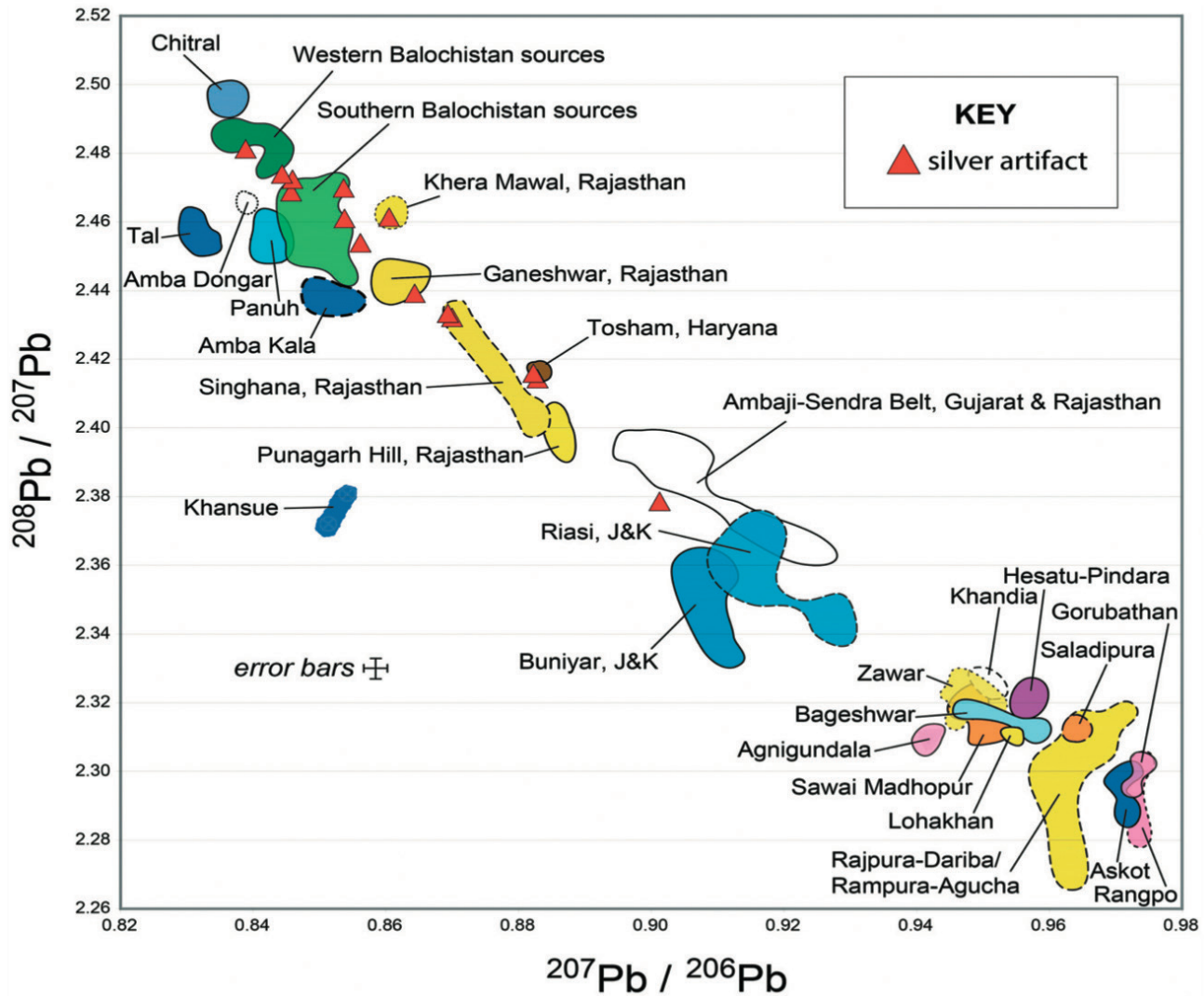


Fig. 2.298: Plotting of lead isotope ratios of silver artefacts from Dholavira against the ore sources for understanding the provenance

falling in Southern Balochistan, northern Rajasthan, Oman sources, also falling in between these sources, indicating mixing of copper from multiple sources due to melting and reusing. Bisht *et al* (2015) also highlights the prospects of inter-regional contacts and trade relations based on the evidence of copper derived from Omani sources. Further, this is also substantiated by the presence of a large number of Harappan sites in Oman peninsula, with artefacts ranging from cooking vessels, pottery, seals, comb, shell objects to name a few.

Oman is an important source of copper in antiquity and the evidence from Dholavira clearly demonstrate the possibility of interregional trade network, further highlighted by the location of Dholavira in the coastal region, acting as a pivot for procurement of raw materials and trading within and outside the territories of the Harappan civilization. Thus, the evidences from Dholavira from multiple artefacts and samples like Indus style circular seal, bead manufacturing workshops, beads found in Dholavira and Mesopotamia, copper sources derived from Oman, all clearly indicate the importance of this settlement in exchange of commodities, far and beyond and participating in a series of activities that could have triggered its prosperity.



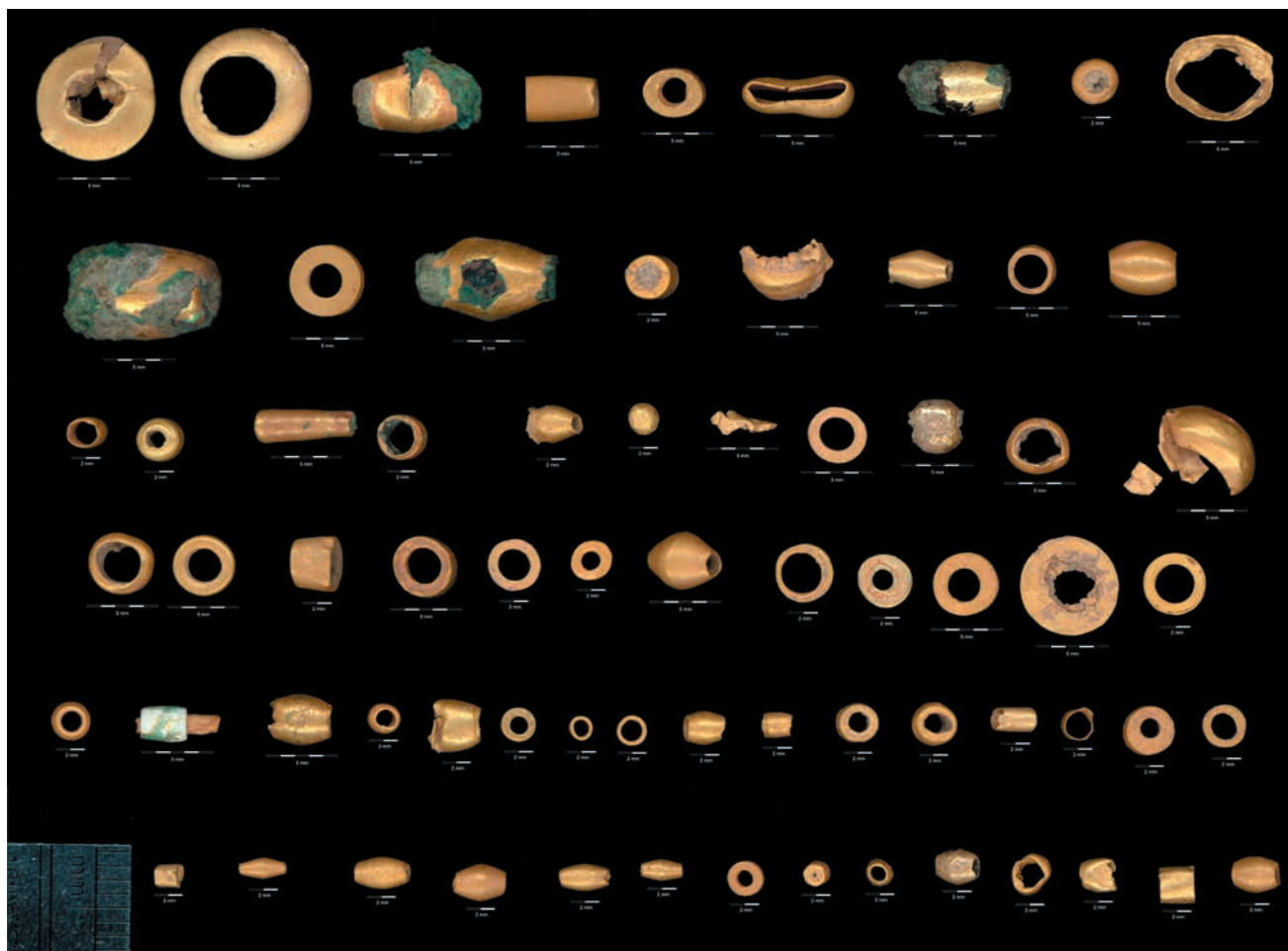


Fig. 2.299: Gold artefacts

2.A.xvi.g Other metal objects

The other metal objects found from Dholavira include gold, silver and lead, out of which ornaments were prepared.

Lead

The Dholavira Harappans used lead on a limited scale. Among the total items, 27 lead ores including small pieces, 1 rod like object, 2 cubical weights, one is very small in size, 1 sling ball, 1 circular disc, 1 stamp seal deserve mention. The number of lead ores found from the excavation confirms that the works of fabrication and extraction were done here. Beside this, 1 sheet tool, made on a thin lead sheet, one of the ends of which is rounded, another triangular, providing a pointed tip on the working edge, is also mentionable. The next solitary example is an arrowhead, having a tapering pointed, curved tip end, the other end is broken, which may have been provided with a tang.

The analysis of lead ores and artefacts from Dholavira by Bisht *et al* (2015) have indicated that seven ores came from southern Balochistan in Pakistan; one galena came from a source near Ganeshwar in Rajasthan; and cerussite fragments (lead ore) came from the region near Ambaji-Deri mines in northern Gujarat.

One isolated sample indicate a sourcing near Tosham hill, Haryana. The analysis also indicated a clear domination of ore sources from southern Balochistan, thus strengthening the interregional interactions between the Harappans of Dholavira with Sindh and elsewhere.

Silver

Silver objects are very rare at Dholavira. Out of four silver objects, only one short, truncated, convex, bicone, one side damaged, bead is found. Rests 3 are small, fragmented pieces of thin silver sheets. As far as the Harappan Civilization is concerned, the main source of silver is evidenced from Afghanistan and Iran. Of the 15 silver artifacts recorded, just over half were beads. The remaining items included coils and sheet fragments. Corroded fragments of a silver wire were found inside a vesuvianite-grossular bead. A piece of this wire was examined at the University of Wisconsin-Madison using EMPA and found to be 94% pure silver.

The analysis of lead samples from Dholavira by Bisht *et al* (2015) have indicated southern Balochistan as a source for six out of 14 samples, and the remaining have diversified sources such as western Balochistan, Khera Mawal region in Rajasthan, Ganeshwar copper source area, Ambaji-Deri area and near Tosham Hill. Thus, even though the number of silver artefacts is very few, the diversified sources indicates the complex nature of trade mechanism of the Dholavira Harappans and also the cultural and trade contacts they have established over a period of time. Thus, combined with copper, lead and silver, all of which can be analysed using lead isotope analysis, diversified raw material sources have been identified, the farthest being southern Balochistan for silver, lead sources and Oman for copper sources.

Gold

The gold objects at Dholavira are represented by smaller finds like beads, micro beads, rings, foils and the like, and larger objects are rare owing to its precious nature and also transferred from generation to another generation. Dholavira has yielded 123 gold thin foil, 116 beads and micro-beads, six rings including a spiral one, one spacer, one disc like object. Gold foil probably made by beaten the sheet metal, frequently used for plating, e.g., one copper bead plated with gold sheet or foil has also been found. The spacer bead from Dholavira has four holes indicating a four stringed beaded necklace or ornament.

2.A.xvi.h Terracotta figurines and other objects

A variety of terracotta figurines have been unearthed from Dholavira, including human, animal including bird figurines. Further, other objects like toy cart frames, wheels, whistles, etc., have also been found. Of particular importance are the human figurines, which are very rare in comparison to the Sindh and Punjab region sites of Mohenjo-daro and Harappa respectively.

However, the depiction of female figurines indicate some sort of influence of the



plastic art in terms of depiction of ornaments. Further, the presence of male figurines is an interesting feature from Dholavira.

Human figurines

In all, eighteen terracotta human figurines or detached limb parts have been found in varying degrees of preservation. There are as seven human figurines and three detached limbs, the later representing a foot, a hand and a badly mutilated torso have been found together in the fill of the northern drain which has just cascaded from a height and is due to meet soon with its eastern counterpart underneath a duct closely in the Broadway of the castle. These figurines were found along with curious things like miniature Harappan pottery forms, a dish-on-stand with a series of lamp like attachment round the rim of the dish and decomposed organic material. The whole context indicates that they were, perhaps, part and parcel of an one-time ritual after which they might have been immersed in the water that was running or stagnating in the drain which had already become defunct due to collapse of the side walls and capstones at several places further ahead, sometime during Stage V itself.

Delineation of bodily outline from the shoulders to the thighs of all these human



Fig. 2.300: Human figurines



Fig. 2.301: Male and female figurines



Fig. 2.302: Female figurines



Fig. 2.303: Human figurines



Fig. 2.304: Human figurines

figurines is pleasingly curvaceous, particularly in the case of female figurines. Although other anatomical details are rather carelessly executed; the front and backsides are flat; head and facial features, hands and feet are far from being real and artistic as fingers and toes are not attempted at all and there is a little effort in giving shape to head, nose, eyes and mouth. These are tried by way of pinching thus causing a ridge for the nose and lips and the resultant depressions for eye sockets. If any clay pallets were provided in these sockets those have since got detached and lost. The breasts are made likewise by applying small lump of clay, and the bonding is so weak that in many cases one or both are now missing. Hands end up abruptly like spatula. Similarly, the ears are not visible now, if at all attempted originally. As far as ornamentation is concerned clay bands in appliqué are used to shown necklaces, girdles and anklets. Two examples of female figurines are shown bearing four necklaces round the neck and three strings hanging over and below the breasts. In one case, all the strings are extremely thin and carefully applied; and the outermost string is furnished with five pendants. An anklet may be seen in the solitarily intact foot that was detached from a small figurine. While females are consciously identifiable due to the presence of breasts or their traces in addition to the nice curvaceous bodyline and heavy ornamentation, the lack of these features help identify the solitary male figurine.

All these figurines are made of greyish white kaolin, and are somewhat indifferently fired showing the unoxidized core. All figurines are in standing pose, the only exception is a small figurine in seated posture. In a few cases, the part of



body is affected by smoky flame while baking. Traces of pinkish red slip are visible here and there on most figurines. The slip has however, suffered extensively because of the objects being buried in moist acidic soil for millennia. All these, therefore, appear rather weathered and washed.



Fig. 2.305: Terracotta unicorn figurine, with broken horn



Fig. 2.306: Terracotta unicorn figurine, with broken horn



Fig. 2.307: Terracotta unicorn figurine *in situ*, with broken horn



Fig. 2.308: Broken figurine, with provision of attaching axle and wheel



Fig. 2.309: Animal figurines



Fig. 2.310: Animal figurines

As these figurines have not come up from any firm stratigraphic context, those can only be examined on the basis of the circumstance of their occurrence. The pottery, particularly the miniature forms of dish-on-stand, perforated jar, pear-

shaped jar besides a carelessly made platter on a wide stand, and being furnished with a series of small cup-like forms round its rim, could as well belong to Stage V or VI. The whole context requires a deeper scrutiny. The drain seems to have been visible to the inhabitants of both Stage of V and VI, and both of them had tried hard to revive it but all in vain. In this regard, mention should be made of three other figurines, which, too, are found from two different and equally tentative contexts. The find spot of each of them lay where the layers of Stage V and VI meet each other intimately.

One such figurine, of similar size and fabric was reported from a layer that was composed of a partially eroded material lying close to a late Harappan house of Stage VI. It was constructed on a filling of what was obtained by way of wreaking extensively and deeply the debris of Stage IV and V from the other, i.e. the southern side of the Broadway. The second figurine is of red clay but with unoxidized core was collected from near the southern arm of the castle, some 50 m away. Here, too, the context was not very certain as the late Harappan structures were overlying the partially robbed ones of Stage V. This figurine, too, was not only treated with red slip but also conformed in shape, size and style to what were collected from the aforesaid drain. The third figurine was collected from the sub-surface layer 3 from near the south-eastern inner corner of the fortification of the castle, where the late Harappan house walls are found abutting on the defensive wall.

In this connection, it is most relevant to record that no such figurines have been collected from habitational layers of the residential houses and streets of Stage V, which have been extensively exposed in the middle town, lower town and bailey. All those, which have come up from the castle, appear from the contact zones where Stage VI structures overlay the filling debris or mostly from the drain which was certainly standing out exposed as it did even when the area had not been excavated. It would, therefore be safer, and even logical, to assign the human figurines to Stage VI during which its cult seems to be in vogue. Perhaps,



Fig. 2.311: Animal figurines





Fig. 2.312: Animal figurines



Fig. 2.313: Animal figurine with arrangement for fitting of wheel



Fig. 2.314: Animal figurine



Fig. 2.315: Animal figurine (Ram?)



Fig. 2.316: Animal figurines



Fig. 2.317: Bird figurines

the most deciding evidence has come from the drain itself. A little downstream the same drain, when both the eastern and western arms had already met each other, has yielded a truly late Harappan seal, quite close to the find spot of the female and male figurines along with the ritual wherewithal. Thus, we hold that all

the human figurines represent a cult that was in vogue during the late Harappan time of Stage VI. Another important thing need to be mention here that from the point where the choked western drain of castle meets with the northern drain, a small late Harappan seal was found. It is worthwhile to reinstate that no terracotta human figurine have been collected from any other stage than the Stage VI. **It is significant to note that the other sites in Kachchh, namely Surkotada, Desalpar, Pabumath, Shikarpur and Kanmer have not yielded any human figurines while Lothal has offered a few crude ones, which stand no typological comparison to those from Dholavira.** The solitary female figurine from Kuntasi (Dhavalikar *et al* 1996: 246, fig.7.44.9 & 7.45.9) has come from Period II, i.e. the late Harappan.

Animal figurines

During the course of excavation, approximately one hundred and eighty- six animal figurines were reported. Under the succession of seven Stages, it is found that no figurines were found from the levels Stage I and II. While, Stage III possess only three examples however on the other hand Stage IV and V dominate the whole assemblage possessing thirty-seven and thirty-five figurines respectively. So, far Stage VI is concerned twenty figurines are reported and Stage VII possess single one. Looking into, its area wise distribution is showed that 52 figurines were found from the citadel, 82 figurines are from middle town area, and lower town contain 15 figurines. Apart from this, four figurines were from annexe area, four figurines found from reservoirs, one figurine from burial ground; two figurines were from drain of castle, and 30 figurines are from outside area of the outer fortification.

Most of the figurines were made up of sandy soil but some examples of kaolin made figurines are also present. Barring only two figurines, not all others display the classical style. Besides there is fourteen animal figurines which were found coated with chocolate red slip along with painting in white and black pigment. Motifs included are generally horizontal and vertical strokes.

It seems that majority of the figurines were stylized accompanied stumpy legs but in two examples of bull and sheep figurines, careful incision work was applied in their modeling, which reflects a kind of realism. Most of the figurines were in fragmentary condition, because of which their identification is quite difficult. However, it is observed that ram figurines were dominating the whole assemblage followed by figurines of bull, dog and elephant along with single piece figurine of tiger head.

Bird figurines

More than eighty-five bird figurines have been found from the site. If we look into the chronological classification of figurines no figurines are found from Stage I, II, and VII, however from Stage III two figurines were found, on the other hand Stage IV and V contains nineteen and twenty-one figurines, respectively. Apart from this stage VI were having 14 figurines which are comparatively less in num-





Fig. 2.318: Terracotta toy cart frames



Fig. 2.319: Terracotta wheels



Fig. 2.320: Terracotta wheels with painted spoked pattern



Fig. 2.321: Terracotta wheels with painted spoked pattern

ber as compare to stage IV and V. On the whole it is observe that Stage IV and V dominate the whole assemblage in style, variety, and number.

Area wise distribution, of figurines in citadel, middle town and lower town gives an idea that castle and bailey jointly contain 36 figurines. The middle town area of the city was having 37 figurines, while the lower town possesses very meagre amount of figurines(only five). Apart from the said parts other areas of the city also contains figurines, like: the annexe having three and the eastern reservoir, stadium provide 2 each. Looking at the typologically classification of these figurines, it is found that out of the total assemblage there is 25 examples of headless duck figurines, which are on stylistic ground stand apart. It is also examined that these duck figurines were in prominence followed by whistle birds and peacock figurines. Physical appearances of the duck figurine were quite different from peacock figurine. The duck figurines are shown with bulge body structure and were mostly slipped with bright red to dark chocolate colour slip along with painting in white pigment. All of them are having flat bottom and perforation were made where wings are made by way of using clay pallets or through incision.

Another thing to be notice is that mostly figurines belong to the duck category was having perforation just below their broad neck area. Perforations were provided



generally to attach wheels and threads with figurines to make them to use as playthings. along with two broken peacock figurines. There are also eight whistle birds and 23 head portions of unclassified (typologically) bird figurines. They are mostly devoid of any kind of slip or painting and hollow from inside. Figurines are broad from middle portion while pointed and thinner at both ends along with perforations. Another noticeable thing is that all these figurines are attached with small round kind of pedestal. There also found 2 pedestal bird figurines of pigeon category and 1 broken tail portion of unidentified bird figurine.

Careful examination shows that more fine work was employed for the modeling of the bird figurines as compared to human and animal figurines. Figurines were generally made up of sandy alluvial soil and are well fired. Around 16 figurines are found to be painted with white pigment over red slipped surface but in one figurine black pigment were used over the cream slipped surface. The colour of slip is dark chocolate red. Painted motifs include horizontal, vertical bands and dots. Anatomical details like wings and eyes are made by way of incision and attaching clay pallets. There is no attempt to make legs of any figurine but in one figurine, bird is shown with stumpy legs and stretched out wings. So, far 3 broken terracotta peacock figurines were found from the collection in which one is the head portion and other two are bust portion of the figurine. Two figurines display application of slip and painting. The slight projection above the head and long slender neck of figurine confirm its being peacock figurine. Perforations were found in one of the figurine on just above the neck portion area like mostly found in duck figurines.

Toy cart frames

Around two thousand pieces and fragments of toy cart frame along with terracotta wheels reported from the site. The large number of findings suggested that like Harappa and Mohenjo-daro the younger population of Dholavira also paid great attention towards their amusement activities. So long as the variety is concerned, the whole assemblage broadly comprises three categories of toy cart frames. All toy cart frames are in fragmentary or broken condition and even some times found in such small pieces that it became hard to identify them as toy carts. In fact no full-unbroken example found from the site. The main varieties contains-solid frame type either concave or straight, perforated chassis type, and Cabin type along with this, various sub-varieties also found like perforated chassis variety. Mainly perforated chassis variety and its sub-varieties are found in abundance. Solid chassis frames both variety concave, flat one contains holes vertically, and horizontally, which was used for fixing wooden pegs and cross bars. These types of carts were usually found in Sindh region or Indus valley. Another variety is of perforated chassis type having different sub varieties mostly concave it is said that this variety mostly found in Kathiawar area. Third variety is of cabin type and only one example of this category is found from total assemblage. Consider number of toy cart fragments was found painted mostly in white pigment and occasionally in black pigment. **The variety of toy cart frames along with wheels with spoked wheel pattern demonstrates the carriage wheel transportation during the Harappan period at Dholavira.**



Terracotta wheels

More than five hundred terracotta wheels were reported from the site, their most probable use was defiantly as an attachment to toy carts frames/chassis. The whole assemblage possesses three variants- 1) wheels with pronounced and sharp hub, 2) wheels with convex surface at one side on the perforation point and lastly 3) the wheels with thin perforation and having both plane sided surface. Large number of wheels gives wide range of diameter from being very thin and small to large and thicker ones. The variation in diameter varies from 113.324 mm to 30.37 mm/17.27. The width of wheels covers the range from 17.54 (without hub) to 29.40 (along with hub). Another notable thing to consider is the number of wheels painted usually with white pigment and occasionally with red and black colour. Generally wheels are well baked having thick to thin fabric sometimes, even potsherds were employed for making wheels. It is observed that at least 50% wheels of the total assemblage were originally painted as paintings were very faintly visible, it might be possible that pigment were gone due to the action of water and wind. There is one example of wheel on which graffiti mark was inscribed reported from the middle town area (54x68x1) and likely to be of stage IV. Wheels on which painting were fairly preserved are total thirty in number and majority of them were from middle town.

2.A.xvi.h Shell artefacts

One of the major craftsmanship activities unearthed at Dholavira is shell working for manufacturing various types of artefacts like bangles, ladles, beads, weights,

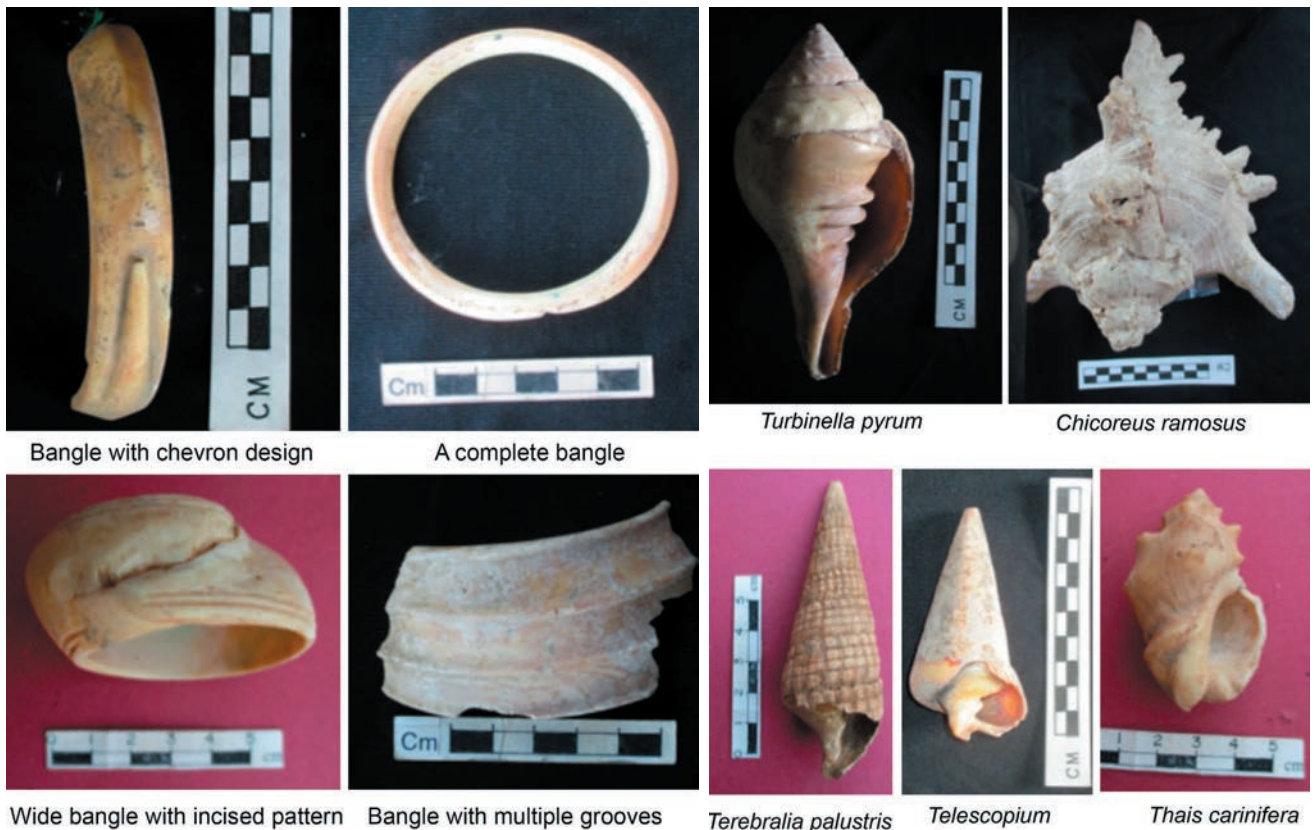


Fig. 2.322: Artefacts made out of shell from Dholavira

Fig. 2.323: Different species of shell found from Dholavira





Fig. 2.324: Shell bowls, the right image showing pipal leaf design on exterior

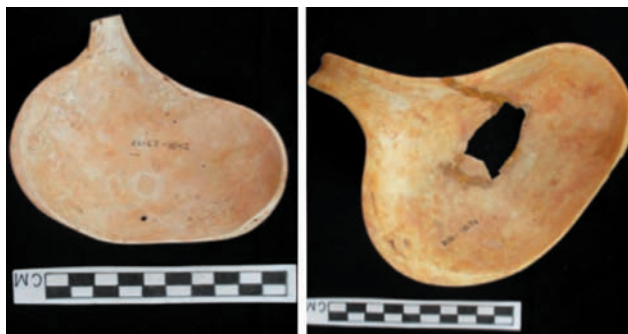


Fig. 2.325: Shell ladles



Fig. 2.326: Shell wastage after the production and discard



Fig. 2.327: Shell ladles



Fig. 2.328: Shell wastage after the production and discard



Fig. 2.329: Shell bangles



Fig. 2.330: Shell bangle



Fig. 2.331: Shell bangles



Fig. 2.332: Shell miniature pillar





Fig. 2.333: Shell inlays, button and other artefacts



Fig. 2.334: Shell inlays



Fig. 2.335: Shell inlays



Fig. 2.336: Shell buttons



Fig. 2.337: Shell inlays



Fig. 2.338: Shell inlays

shell inlay pieces, decorative items to name a few. At Dholavira, empty dead shells of the animals belonging to the Phylum Mollusca, an invertebrate group of organisms have been recovered from all over the site in appreciable numbers. These have been found ranging from complete to broken, fragmented ones. Their shell identification revealed the presence of a variety of molluscan species belonging to both marine as well as freshwater habitat. A majority of the molluscs identified are of marine origin of which marine gastropods are maximum in

number (16). The most commonly occurring shells are those of the large marine gastropod *Turbinella pyrum* which externally has a smooth white shell and an internal thick columella having grooves. This is represented by complete shells as well as parts such as columella, apex, spire portion and main shell whorl fragments. Most of the shells range in size from 90 to 200mm. Similar shell fragments of another large gastropod *Chicoreus ramosus* are also recorded. Externally the shell is covered with numerous spines whereas internally the columella is devoid of grooves. A few shell fragments such as main shell whorl, columella of *Pugilina bucephala*, a shell smaller in size compared to *T. pyrum* and *C. ramosus* are also identified.

Besides these, shells of small gastropod like those of *Thais carinifera*, *Conus sp.*, *Cypraea sp.*, *Oliva sp.*, *Nerita sp.*, *Natica sp.*, *Neritina crepidularia*, *Cerithidae cingulata*, *Telescopium telescopium* and *Terebralia palustris* occur alongside of which the latter two are fairly common. Besides gastropods a large number of scaphopod shells belonging to *Dentalium sp.* occur. Very few marine bivalves are identified most common being the large blood cockle *Anadara sp.* along with broken shells of venerid clams (*Paphia gallus*). Although two varieties of oysters are recorded *Crassostrea sp.* and *Placuna placenta* their occurrence is very limited. Freshwater molluscs are represented by a few shells of the freshwater bivalves *Lamellidens sp.* and *Pareysia sp.* along with small gastropod shells of *Melania striatella tuberculata*.

The study of the shell remains has indicated the following:

1. Presence of a rich shell industry where manufacture of various kinds of shell objects was being carried out within the settlement.
2. Besides production for export, shell objects were used by the Dholavira inhabitants in their day to day activities
3. Occurrence of certain molluscan shells which were brought to the settlement due to natural agencies such as wind, inundation, and human related activities

Shell bangles are the commonly occurring artefact made out of shell and around 2000 fragments have been recovered, mostly made of *Turbinella pyrum* shell variety. This is followed by shell beads, which numbers to around 1130. Shell ladles form another important variety of artefacts, the sizes vary from small (37.76mm in width and 44.18mm in length) to large (138.20mm in width and length of 150.00 mm). The ladles are mostly manufactured out of *Chicoreus ramosus* shell variety. Shell bowls fragments were also found among the collection mostly made of the species of *Turbinella pyrum* and *Pugilina bucephala*. One fragment of a bowl has a *pipal* leaf motif on the exterior, which is an important motif during the Harappan period, the origins of which can be traced back to the antecedent cultures preceding the Harappans. The most striking and important findings of shell are a variety of inlay pieces of different forms and shapes. This is a major finding keeping in view of the fewer evidence from other sites outside Gujarat. Gujarat coasts, being the source of a variety of shell remains, have been utilised by the Harappans in a major manner, and the inlay fragments have indeed pro-



vided an insight into the flavour and artistic nature of the Harappans. The textile and fabric remains, though have not survived over which these inlay pieces might have been adorned. Nevertheless, this is an important finding to understand the inlay patters. The cloak work by the 'Priest King' from Mohenjo-daro have trefoil pattern decorations, and it may be possible that such type of decorations could have been generated using the inlay fragments. Kachchh region to the present day has a rich and colourful embroidery patterns, now mostly adorned with mirror fragments. This could be the continuity of the long drawn patterns that emerged thousands of years ago.

The shell remains also give an insight into the manufacturing processes involved in producing various artefacts. The chief shell raw material used were the three large marine gastropods *Turbinella pyrum*, *Chicoreus ramosus* and *Pugilina bucephala*. These have a more or less common source area of procurement the shallow intertidal coral reef areas in the Gulf of Kachchh. Here these molluscs inhabit the areas in colonies and can be handpicked at low tide. Considering the large-scale use of these shells during the harappan times, their collection was a regular fishery carried out probably under controlled supervision. Complete good quality shells in different sizes were regularly available to Dholavira shell workers. Although items like bangles require *T. pyrum* shells in a particular size range, small shells were also procured for other purposes such as inlays, libation vessels, bowls, etc.

Production of shell bangles appears to be the main focus of the shell industry wherein *T. pyrum* shells in a specific size range were preferred 50-200mm. This indicates the production of small sized bangles besides those of adult ones. Good quality shells were selected. These were prepared and then sawn to extract shell circlets of varying widths. Use was made of Copper/ Bronze saws which were the strongest for cutting the *T. pyrum* shells which are very sturdy shells and difficult to cut. After bangle extraction, the circlets were engraved with the chevron motif and then polished. While the remaining parts of the shells were processed into other objects such as inlays, beads,. The internal thick columella was further made into rings, and conical objects. A maximum utilisation of the shells is observed.

2.A.xvii Cemetery and disposal of dead at Dholavira

It is necessary to state at the outset that the funerary monuments are scattered far and wide to the east, north and west of the city but the Harappan cemetery that has been fairly investigated lies in the west in a sloping landscape of a motley terrain of rock and soil. It is spread over an area that admeasures more than fifty hectares. It is strewn with a variety of funerary structures. A large area running along the Manhar is particularly crowded with such grave structures. Another significant topographical feature in the area is a nearly circular depression, now used for cultivation. Satellite imagery had suggested that the depression could be a buried water body and the same has now been vindicated by a limited archaeological probing that it was artificially created by the Harappans in order to store water remaining surplus after filling a cascading chain of reservoirs, provid-

ed all around within the city walls.

This water body seems to be of exceeding importance in that a series of five or six, large and high, hemispherical tumuli stand out noticeably on its bank while the regular cemetery spreads out farther to its north, west and south, more particularly along the bank of the nearby Manhar. Many of them still survive intact while a good number have suffered varying degrees of damage by the nature and man down the millennia. Man is a bigger culprit who has wrought destruction for the purposes of reclaiming the land for cultivation, laying threshing floors or campsites, or for making cart tracks. Recently, a large-scale damage has been caused while making a dam across the Manhar. Luckily, only the earth lying around the surface was removed, and the stones used in building sepulchres were largely left behind, although the superstructures of some of the monuments seem to have suffered from the vandalism. Further, it was most heartening that the most impressive tumulus was spared as it was used for anchoring the said earthen dam. It will be seen later on that it was an ostentatious funerary monument, hitherto unknown in the Harappan context.

Archaeological investigation was best concentrated in the western cemetery which is, on the present showing, exclusively Harappan. It is often referred to as main or regular cemetery also. It may be stated that, despite vandalism, many structures, of course, of less pretension are still far many. About three dozen of them have been investigated. All those are remarkable for providing a flood of information with regard to the diversity of shapes, sizes, architectural styles and construction techniques. Save for two examples of inhumation and a few fractional burials, all the sepulchral structures are bereft of any skeletons or bodily remains, while most of them contained offerings varying in quality and quantity. The offerings consisted mainly of pottery. In some cases, one or two beads and a little amount of gold were also formed part of the goods. Tumulus-1 is exceptional in yielding one full necklace of steatite, a gold bangle and a few other luxury items along with a considerable assemblage of pottery.

At best, all these are memorial monuments, or say cenotaphs, raised in memory of the dead, thus suggesting a different mode of the disposal of the dead that the Harappans in Kachchh, particularly at Dholavira, had adopted whereas the usual norm with the Harappans is said to be the interment of the body, laid supine in north-south direction with the head being placed on the north, in a grave cut rectangular that was obviously oriented N-S. At Dholavira, the direction of the majority of the cenotaphs remains almost the same, albeit with a few exceptions. The absence of skeletons in nearly all graves, barring few exceptions, at Dholavira and also Surkotada is, of course, of a great seminal significance.

The above is all about the western cemetery which belongs to the Harappans. It may be reiterated that the majority of the memorials, which have been unearthed in the cemetery, were found to belong to the three cultural Stages, viz. III, IV and V, while those of Stages I, II, VI and VII have remained elusive therein, probably save for one tumulus which is a conspicuously large, high and circular monument



of mortuary nature. It lies at the south-eastern end of the said buried water body, not far from the south-western corner of the city wall. Two pieces of evidence in and around it suggest that it was some way connected to the people of Stage VI. The first is that a long and wide pathway from the eroded top of the city wall to the tumulus was constructed by the late Harappans and secondly, the potsherds of theirs are found scattered on the top of the latter. So far as Stage VII is concerned, at least one grave was exposed on top of the deposit of the castle. Many grave structures of two or three types have been noticed over the ruins of different parts of the Indus settlement, particularly in the lower town area as well as in the near and distant neighbourhood of the site. Absence of tombs in regard to the first two stages (I, and II) may not be considered as negation of the practice, but only as a shortcoming in the present state of research. In the light of above, it will become a little easier to understand the sepulchral monuments at Dholavira in their suggested chronological framework.

Types of funerary architecture

A limited survey and more limited excavation in the western cemetery have brought to light six major types, the type-I have three variants:

1. Rectangular memorial
 - 1.1 Built memorial
 - 1.2 Cist, or Cist in Cairn
 - 1.3 Rock-cut



Fig. 2.339: Burial 5, Dholavira

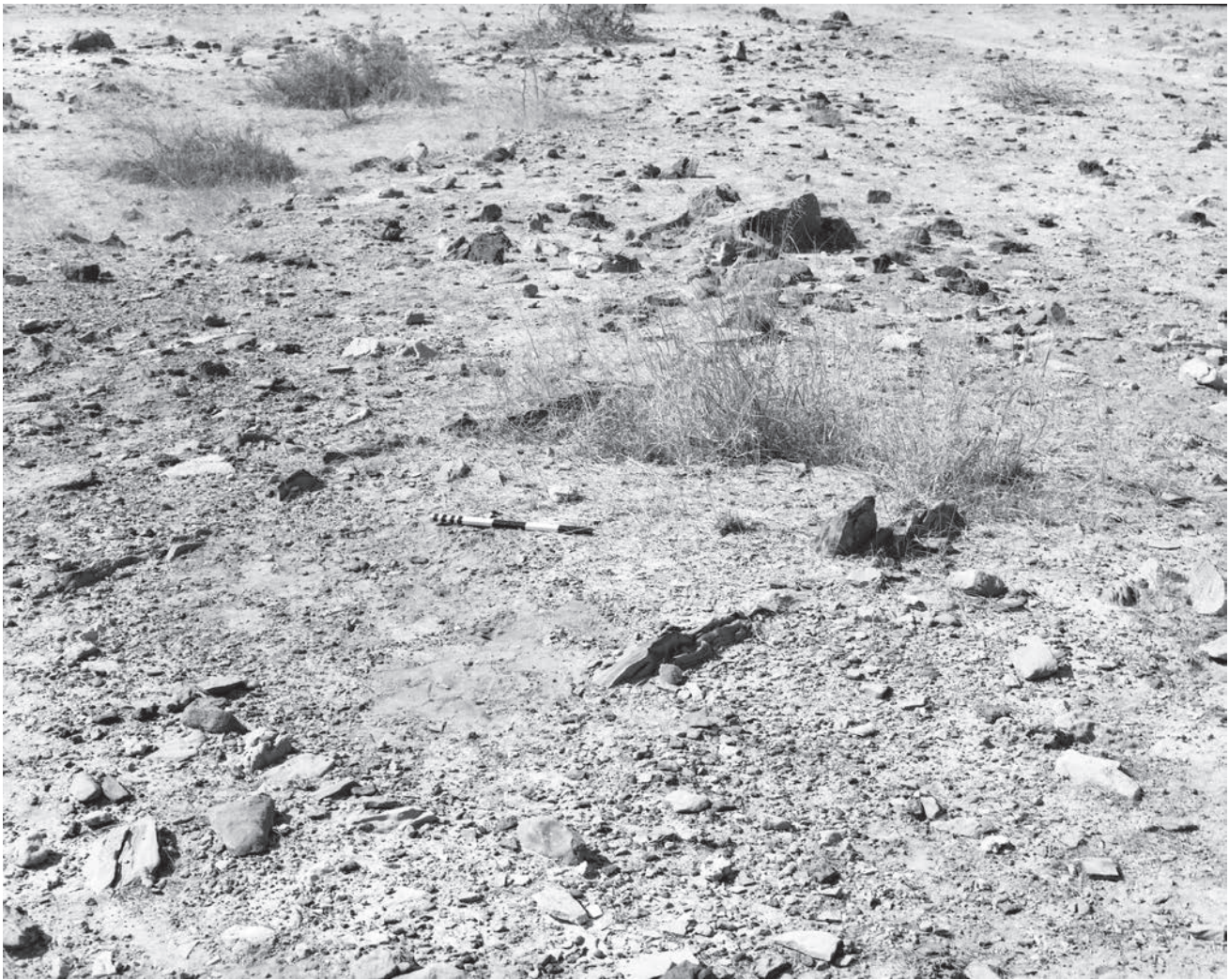


Fig. 2.340: Burial 6 before excavation, Dholavira



Fig. 2.341: Burial 6, Dholavira



Fig. 2.342: Burial 6, Dholavira





Fig. 2.343: Burial 6, Dholavira

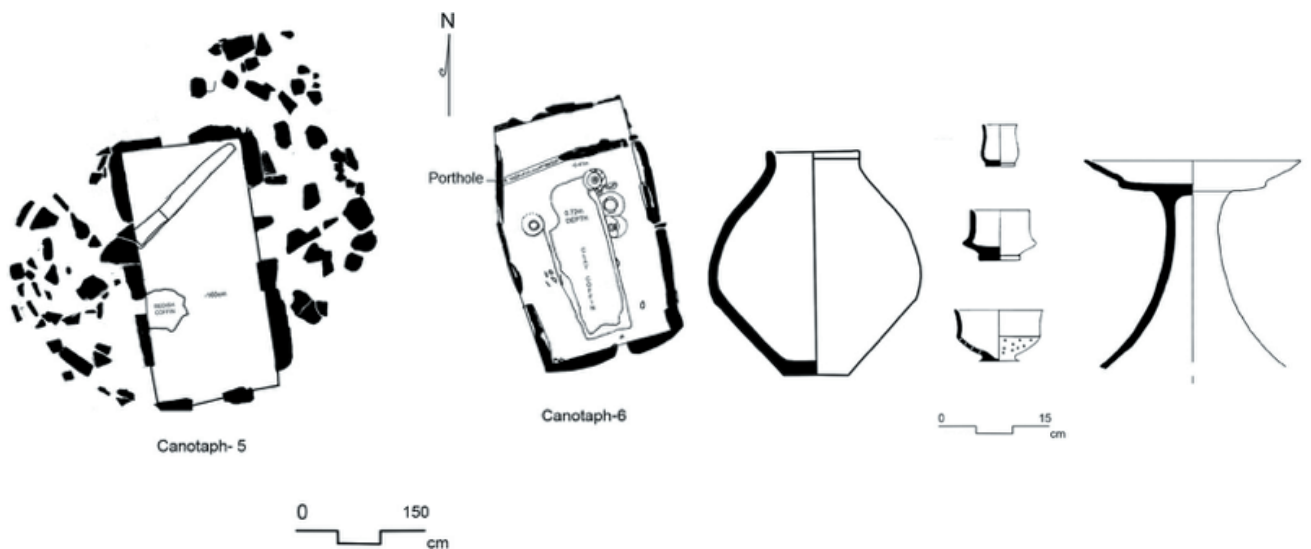


Fig. 2.344: Burial 5 & 6, Dholavira

Fig. 2.345: Pottery from Burial 6

water vessel while on the opposite side, nearer the head, is kept a dish-on-stand further, it is interesting to note that the western corner of the single slab that stood upright along the northern side is found intentionally broken to make a large

2. Cairn: round, oval, long oval, or egg-shaped
3. Composite graves in a circle, a semicircle, or a rectangle
4. Fractional Burial
5. Inhumation
6. Hemispherical monument or tumulus

Rectangular Memorials

Built memorial

In the cemetery, visibly the most numerous are the rectangular structures. The majority of them are oriented along N-S direction while a few examples have E-W or NE-NW alignment in terms of longer side. Those excavated are built over similarly oriented pits cut into the ground. All of them were symbolical graves, furnished with one or two or a collection of pots. Many of them contained one or more beads of semiprecious stones, occasionally with a bead or pieces of gold.

After the grave goods have been deposited, the pits are filled in with earth, sometime mixed earth rubble, and finally topped with a squat rectangular structure above the ground. Each such structure is found to be in accord with the orientation of the underlying pit. The offerings in the N-S oriented pit are placed or huddled normally in the north, either by its eastern or western side. In case of the pit being oriented east-west or, northeast-southwest the grave goods are placed on the east or the north-east, respectively. The placing of offering most possibly indicates the normal positioning of the head of the dead, had it been a proper inhumation which might had been the earlier practice in the society before the latter switched over to a new and different mode of the disposal of the dead and yet a structure was raised in memory.

Another noteworthy observation in regard to the rectangular type of sepulchres at Dholavira is that the sizes range from normal to small ones. Significantly, the area that lies to the west adjoining the Tumulus-1 and to the north along the bank of the Manhar is practically littered with such structures while, at places, those are intermingled with the other types as well. The built memorial, oriented in E-W direction, measured 3.35 m and 1.10 m in respect to their length and width. The example mention above was not taken for excavation.

Cists, or Cist in Cairn

The cists differ from the rectangular memorials rather in quality treatment for being lined and usually capped with large slabs limestone. Two cists, lying almost parallel to, and at a close distance from, each other, and both being oriented N-S, are opened up for investigation. Both are located in that part of the necropolis where rectangular structures were preponderant and which lies to the west of the domineering Tumulus-1, and the Manhar runs close by, to the south of the area. Some special importance seems to have been attached to such cists as indicated by the use of fine quality limestone of pleasing yellow colour, sometimes with purple bands, for the uprights and the capstones.



The western cist (Grave 6) was in a fair state of preservation with its underground features being intact. It measures from 2.90 to 3.08 m N-S, from 1.60 m to 1.96 m E-W and 1.12 m deep. Variation in length and width, to some extent, owes to the slight displacement of the uprights, not standing now in perfect vertical position due to the thrust coming from the sides and to the flow of earth with water percolation from the top. Most curiously, it contains a simulation of a coffin, made of fine-grained grey clay that is shaped into a highly stylized human form that is laid along the longer axis.

It was found to be smeared all over with a thin coat of red ochre. It measures 1.84 m long, 0.68 m broad at shoulders and about 12 cm in thickness, and lies at the depth of 0.73 m from the top of the upright. It is not placed on the floor of the grave, but is propped up with full pots and stone pieces which naturally rest on the level bottom of the cist.

The eastern sideline of the coffin though runs nearly straight, but for slight narrowing in the lower part, the western part can be easily perceived of three parts, viz. head, trunk and lower limb. While the head is imitated by curving the north-western part, the trunk by a straight line, the lower limb is shown by a marked concavity. The head portion measures 22 cm. The southern line of the coffin-like terminates into two protruding stumps with a concavity in between, obviously for giving an idea of legs. Thus, the overall configuration imparts to it semblance of anthropomorphic form. The conformation seems to convey as if the face of the dead was supposedly turned towards the west. As expected, the replica of the coffin which is only 12 cm thick contained no skeleton as was confirmed when a piece of clay of it was cut out from its chest area. The clay it was made of contained few bits of charcoal which seem to have got into the earth, accidentally, certainly not intentionally, hence not suggesting presence of any ashes in it. Apart from those used as props under the coffin like feature, there are additional full pots, placed on the floor of the cist by the eastern side. In addition there are two more complete pottery forms. A little above, to the right of the coffin, is placed a curved opening, most probably, in order to serve as a porthole for facilitating to deposit subsequent offerings to the dead who was believed to be lying there in eternal peace.

The above mentioned vessel and dish-on-stand which are found inside seem to be part of original offering, if not inserted subsequently through the porthole. The cist was finally filled in with earth and covered with slabs a part of which has been found slipped into the grave while the others are missing save for some pieces found outside. Furthermore, there is another interesting subsidiary feature attached to the cist. A small rectangular area, enclosed by low rubble walls, is attached to it from the north where the porthole is. The walled area is enough to seat a person. It appears that it was meant for a priest or a family member to insert fresh offering into the cist after it had already been covered. Some features, faintly traceable outside on the surface, indicate that the cist was, perhaps, surrounded by a circular wall. At present, it is difficult to postulate whether there was small tumulus over the memorial. The other cist (Grave no. 5) which measures 3.18 m long, 1.65 m broad and 1.60 m deep lies 4.5 m away towards the east. It



follows the same basic form and construction style that pertains to grave no. 6 though it was found to have been willfully disturbed, probably in hope of striking a cache. Its capstones were found broken and slipped into the chamber which got subsequently filled in with the water-borne earth. However, in the lower levels, there were found several pottery plates and some potsherds of red ware, lying certainly not in their original arrangement though, surely once formed part of the grave goods.

The surface around the cists seems to have been scraped off in recent time while making the said earthen bund. The vertically placed limestone slabs for lining both the cists and supporting the capstones were, therefore, found peering above the prevailing surface. Yet, it appeared as if the cists were once surrounded by a circle of stone, the outlines of which were feebly visible, although not figured out well as the area around is otherwise crowded with other graves, which sometimes run into, and thus partly damage, each other. It is not unlikely that the circular area was built over with a pile of earth or stones which have since been erased. These are just two out of a few such examples which are visible on the surface of the cemetery. There are some memorials, likewise lined with smaller slabs or stones, but are of very smaller size. These are either furnished with pots of smaller size or none at all. Such structures either meant for the children or the builders did not indulge in expending more time and labour. There exist a few cists, surrounded by cairns, in the necropolis. One such that is found lying in the ruins of the city lies to the west of the multi-purpose ground. Since it is not yet opened, no precise cultural context can be assigned to it. In any case, it should be posterior to Stage V for certain.

Rock-cut

Rock cut chambers, shallow or deep, may in fact represent an expansive variant of the rectangular type of cenotaphs. Four such examples have been investigated so far. Two of them pertain to the hemispherical monument and will be discussed later on in the relevant context.

One of the rock cut chamber that lies somewhat halfway between two hemispherical monuments. It seems to have been completely evacuated and robbed sometime in the past and then got filled up by nature in course of time and a huge bush of cactus grew over it. From its overgrowth some large pieces of yellow sandstone were peeping out. At first sight it held out to reveal a well which would have been an interesting feature in the cemetery. But, on clearance, it turned out to be a robbed grave measuring 4.55 m N-S, 2.30 m E-W and 2.30 m deep (ratio 2:1:1). On digging, it yielded nothing but water-born deposit. Around the chamber there are large and heavy limestone blocks lying helter-skelter and a haphazard pile of yellow earth. While these stones appeared to be parts of covering slabs, the earth is what normally uses for making good quality mud-bricks although the source of a latter is not traceable in the neighbourhood, hence may have been brought from elsewhere. Very likely that the rock cut chamber was duly furnished with grave goods, covered and then surmounted by a mud brick superstructure of hemispherical form.



The other cenotaph came to light at an unlikely location in an unsuspecting circumstance. It was found during probing the cultivated field for ascertaining or otherwise existence of a buried water body GPR survey suggested the presence of ground sediments and yet indicated an anomaly, particularly at a point that lay at distance of 90 m south of Tumulus-2. It was deemed to be an ideal location to gauge the sediments in the oval area of cultivated fields, believed to be a buried water body, as well as check the said anomaly. On probing both turned out to be very useful. The sediments of 1.80 m thickness are found to be water-borne mixed with the Indus sherds occasionally occurring down to the bed rock, thus confirming the creation of an artificial lake by the Harappans.

The said anomaly turned out to be a rock cut cenotaph underlying 1.80 m thick sediments of which the basal layer of 15 cm thickness formed of light reddish sand of aeolian nature. The underlying cenotaph, measuring 2.85 m N-S, 1.42 m E-W and 0.90 m in terms of length, width and depth, is cut into the bed rock. Inside it there have been found three sets of offerings made on as many successive occasions, each represented by a set of pots, accompanied with some items of brick-a-brac, placed successively on a separately made earthen beds from the bed rock upwards. The three offerings are found placed respectively at the depth of 20 cm, 60 cm and 90 cm. The lower most one included, besides pottery, three gold and three semi-precious stone beads. It is difficult to decide whether each set was meant for one individual or different members of a family or a clan. It is significant to note that the pottery was arranged in an order, not huddled haphazardly, as normally found in most of the graves. The second issue pertains to the time of making this cenotaph. The pottery is unmistakably Harappan in form and fabric. As a rule, the pottery made for funerary purposes is usually poorer in quality in respect of fabric, painting and surface decoration. Application of slip is not unusual but paintings are quite rare to occur. A deeper study that is underway may decide the precise cultural stage to which the goods belonged. But the very use of the bed rock of a deemed lake for cutting a grave is quite intriguing.

The lake had certainly gone dry when the grave was cut. We, however, understand that the lake may have gone dry when the Harappan water harvesting system had collapsed irretrievably sometime during Stage V. The wind had spread over the lake floor a blanket of sand, when the cenotaph came into being. This postulate is, perhaps, more plausible as soon after the dry depression of the lake started being filled up by sediments year after year, century after century, until it was filled to the brim. The other situation which is less likely is that the cenotaph was caused to be made when the lake was passing through one of the dry spells during one of the earlier stages. However, the cenotaph is interesting for its location, for being cut into the rock under the lacustrine sediments, and also for showing an orderly array of the offerings.

Cairn

A few cairns, both of smaller and comparatively larger in size, have been opened up. Each one was raised over a round, oval, long oval or egg-shaped pit. We



Fig. 2.346: Rock-cut burial

have already seen that there are sufficient indications that some of the cairns were raised over a cist as well. The number and variety of pottery as the grave furniture, or its complete absence, depended on the size of a cairn. Noticeably, some very small cairns are found being built over very shallow and small pits which were dug rather carelessly and have as saggar base.

Usually, such small structures are devoid of any goods. Many of these small ones are just 60cm across and 30cm deep hence just symbolic memorials. Some large circular cairns are upwards of three metres across. More or less, similar is the case with the oval or large oval cairns, of course with longer lengths. It is difficult to surmise whether a particular phenomenon is suggestive of socio- economic status, age, or gender the person in whose honour that is built. It may, however, be pointed out that there is no specific zonation for these type of structures as they are, by and large, intermingled with all other types of cenotaphs that are noticeable in the densely used area of the main cemetery. In some cases the underground pit was filled with the earth, and a few packed with the stones before raising an over ground cairn. The elaborate examples are normally furnished with a large collection of pottery, usually placed in the eastern or the northern part of the pit. Such a placement is, perhaps, symbolical, as if to indicate as to where the head of the deceased should have been had it being an inhumation. Away from the regular cemetery, an open terrain, further north, is also dotted with



grave structures of lesser dimensions. Some of them were investigated, but usually found empty. Citing examples, three oval cairns provide max. length, max. width and depth respectively measuring 2.76 x 1.58 x 0.40 m (Burial no. 3), 3 x 1.5 x 1.57 m (ratio is 2:1:1) & 2.5 x 1 m while the round one is 1.6 m in dia. and upwards of 0.30 m in height. There is another round cairn that registers dia. of ranging from 1.75 to 2m shows a rectangular chamber in the centre and can very well be put under type 1.2.

Stone lined circle

There are examples of large circles, three-fourths of a circle, or a half circle containing inside a single or multiple grave-like structures. However, none of them has been excavated so far. Most likely, the details of construction and contents of such individual graves may, however, not be much different from such rectangular, circular or oval structures which have been excavated so far.

Fractional Burial

A solitary example of a fractional burial containing a human tooth and some small bone fragments in a shallow pit, marked by a stone upright at either end, has been found on the eroded slope of the southern margin of the middle town. It was oriented roughly along N-S. It is necessary to mention here that this part of the town was intentionally cleared of structures under a planning modification that was brought about subsequent to the devastating earthquake which occurred at the end of Stage IIIA. That vacated part was, however, reappropriated for constructing dwelling houses only during Stages VI and VII. The time of this fractional burial, although found seemingly in a room of Stage III A, remains indeterminate due to scanty evidence at hand not leading to any convincing conclusion whether the location was accidental or intentional. It is, however, certain that it lay on the top of the deposit of Stage III A and that no pit line was at all traceable in the overlying debris of much later stage. There was found no complete pots or objects although small potsherds of stage III were present along with the interred human remnants though both of them may or may not have been related to each other in terms of ritual. That, such a funerary practice was in vogue, albeit sparingly, during some phases of the Indus culture, is certain and hence this piece of evidence becoming interesting. A skull is found stuck in a drain that descends from the castle into the bailey. It could be an accidental case of detachment from a later grave, built up higher up possibly during Stage VII, when inhumation was practised as will be mentioned later.

Some grave-like structures are noticeable just on the top of the defensive wall towering above close by. Similar features abound on top of the eastern wall- cum-stand of both the stadiums. At present, nothing much can be drawn out of it pending a proper investigation. One thing is, however, certain that all those should pertain to stage VI or VII, most plausibly the latter. Another fractional burial in the cemetery is exposed to the south of the bund and only covered by a thin surface layer which sealed the human bones amidst a lot of broken sherds. The bones included a flat piece, probably of cranium, a radius, three phalanges and some



bricks which could not be figure out well. The whole scenario was quite disorderly, again certainly due to the large- scale damage wrought in recent years. Even this was not clear whether it was a proper inhumation or just a fractional one.

Inhumation

Only a solitary example of inhumation (BR-12) is found so far in the regular cemetery. While sprucing the area in the cemetery a copper mirror was found on the surface. Later, when visible grave structures were being demarcated, the surface was scraped and an oval pit line, measuring for a max. length of 1.95m N-S and max. width 1.18m across E-W, was observed along with some bone pieces precisely in the find spot of the mirror. Further investigation brought to light a skeleton laid in N-S orientation with the head being placed on the north and the face turned towards the west. Part of its skull is found missing. The head reclines against a pottery jar, kept in position, although a part of it is now missing, as is the case with of the skull of the dead, obviously due to its being now covered with a thin surface layer.

The skeleton contains damaged cranium, shoulder bones, ribcage, mandible with denture, ulna and radius bone of the arms along with phalanges, pelvic girdle, lower limbs with metatarsal while facial bones along with maxilla and teeth are missing. Some features like fingers of left hand and left leg are not clear. Besides, there are found two pieces of a shell bangle which was once worn on the right wrist by the deceased. It was a female is judged by its anatomy and smoothness of the bones in addition to its association with the mirror and the bangle. The filling material, whatever is remaining is yellowish earth. The superstructure, if any, has since been completely erased recently by the villagers for collecting earth for raising the a fore said bund nearby.

Later inhumation in the city ruins

Furthermore, the other graves with skeletons, normally without grave goods, or just with a pot as in one case, have been exposed, not in the cemetery but in the ruins of the lower town, although many grave-structures, have been noted in almost all parts of settlement, even on the defences, and in the south- eastern part lying on the other side of the Manhar, without showing any evidence of particular localization. All of them are certainly posterior to stage V. An interesting example of internment, topped with a cairn, was opened at a high place near the north gate of the castle. It was a pile of stones, making a somewhat circular cairn. When opened, it entombed a skeleton in a shallow pit cut beside a structure of Stage V. The dead is buried roughly in an E-W orientation. It is in a crouched position, with the head being placed towards the east and facing the south. While right part of the skull is missing, all other limbs are intact, albeit somewhat dislodged. A chert blade found deeply lodged into a cervical vertebra indicates towards a possible cause of death of the victim in a fatal assault. A pottery bowl is placed in front of the face. Circumstance as well as the bowl indicates towards its pertaining to Stage VII. Some of the later burials, with or without the skeletons, have come up to view during excavation in the lower town which, as is well understood now,



had been abandoned in Stage V and never occupied again for habitation. The skeletons interred in the graves suggest that the deceased had a robust body and ripe age at the time of death. There were no grave goods which could shed light on their time and cultural affiliations. All these sepulchral monuments are conspicuously visible on the surface.

Hemispherical monuments

Six hemispherical tumuli are the most conspicuous features of curiosity and promise in the zone of western necropolis. Those surround the aforesaid depression representing a buried water body and were believed to be of special significance in terms of their shape, size and location. Two of them, designated as Tumulus-1 and Tumulus-2, have been subjected to archaeological investigation which confirmed their being funerary monuments of exceeding importance and unique character (plate of pre excavation both the tumuli). As these tumuli ring an ancient (Harappan) reservoir and lie in the necropolis itself.

The investigation has also revealed that both the monuments share some common features and yet are two variants of one architectural form of pretensions hitherto unknown in the context of the Indian Bronze Age. Both consist of a deep and wide rock cut chamber, surrounded on the ground by a massive circular mud-brick structure made in two tiers, and finally filled in and topped with random earth, sand containing stone pieces. The building activity has involved five stages: (1) cutting of a large and deep rock cut chamber; (2) placement of offerings in the chamber; (3) construction of a broad circular mud-brick platform over the ground around the chamber; (4) raising of a peripheral ring wall of mud-brick up on the said (basal) platform; (5) filling of the open shaft above the chamber and within the encircling brick-work and raising it into a pile-up earth, etc. so as to impart a domical form to tumulus-1 and flattened top to Tumulus-2.

So far as ritual offerings are concerned, those could be found only in Tumulus-1 in which the floor of the chamber has been struck though a small part of it yet remains to be cleared. It could not be possible due to the dislodgement of immensely large and heavy pieces of covering slabs. However, there has been found evidence of plastering on the exterior of Tumulus-1. Not unlikely that the Tumulus-2 was also treated likewise.

In both cases, it is also observed that the rocky surface, rising somewhat higher than the surrounding area with a slope towards south and east, was chosen for building the funerary monuments. Another activity common to both was reopening of the central area, at least once in case of the Tumulus-2 and, perhaps, three times in that of the other one.

The points of difference which could be observed so far are two: (1) only Tumulus-1 was furnished with radial brick walls emanating from the peripheral rim of brick-work to run on the basal platform towards the central area, whereas the other one is devoid of any such walls, and (2) the central chamber of Tumulus-2 was covered with a huge capstone while the other did not yield such a feature.

The smaller tumulus, i.e. Tumulus-2, is discussed first, though investigated later, because of its comparative simplicity of design that may help comprehend other one easily.

Tumulus 2

It stands on the northern bank of the buried water body. It has suffered a little from both natural and human vandalism. For more than two millennia, it has been exposed to the elements. In recent years, a local farmer has quite dressed it up from three sides, i.e. east, south, and west, for raising a temporary wattle shed for his seasonal stay there to tend crops. Nevertheless, it was in a satisfactory state of preservation at the time of undertaking archaeological digging.

Topographically, the tumulus rises to a height of 3.35 m above the surrounding ground level while its diameter measures between 25 m and 28 m. These measurements should not be taken for real ones of the monument as much of the eroded material has spread out spherically over millennia. Subsequent excavation of the tumulus has shown that the diameter of the original construction should be about 22 m or slightly upwards whereas the height rises to 2.9 m though some reduction in the latter due to denudation is possible.



Fig. 2.347: Tumulus 2



Tumulus 2, Cemetery Area Dholavira, district Kachchh, Gujarat

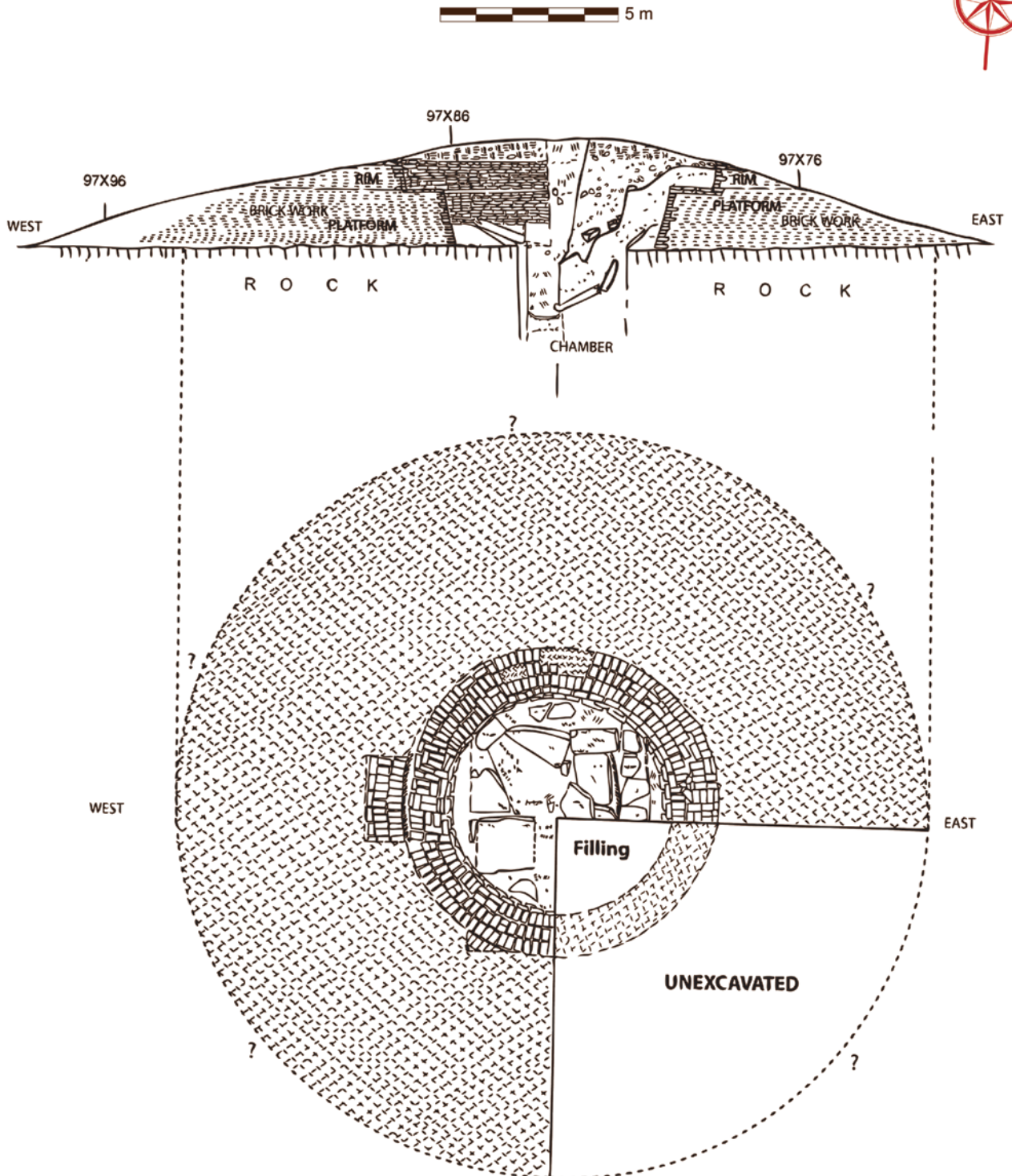


Fig. 2.348: Plan and elevation of Tumulus 2

It may, however, be added that no segment in its periphery could be firmly ascertained from the limited dig that was made in a small cut in the southern sector where much of the eroded material, derived from the brick-work as well as the capping rock dust, has settled. However, the internal details with regard to the

design and construction have been determined well. Mud-brick of varying sizes, such as 9 x 18 x 36, 10 x 20 x 40 and 11 x 22 x 44 cm, all falling in the Harappan standard of ratio, have been used in construction.

From below upwards, there are apparently three major components: a rock cut chamber covered with a large stone slab; a two-tiered mud-brick construction encircling the chamber; and a sand filling topped by rock material. The rock cut chamber measures 4.60 m along N-S and about 3.04 m E-W (ratio 3:2), while its depth is ascertained only to about 1.80 m, beyond which further digging was prevented by the enormously large and heavy pieces of the fallen capstone, broken and slipped into the chamber until the last season (2005) of the field work came to a close.

As stated above, the chamber is cut into a sloping rocky surface and the encircling brick-work is made of two tiers, sitting on each other. The circular lower ring of the brick-work, round the rectangular chamber, is broader and thicker and thus naturally registers variable distance from the latter. The upper brick-work is re-ceded by 1.20m to 1.55m from the lower one thus rendering the whole construction a terraced formation. The vertical sides of both the brick work register an outward batter. As a result, the internal diameter of each, like a funnel, becomes progressively broader upwards resulting in providing a telescopic form.

Resting on the sloping terrain, the lower one forms the basal platform which is made of 18 to 19 brick courses registering a height of 1.72 m to 1.80m, of course, with the said batter. As a result, the central shaft, encircled by the brick-work, is narrow at the base and wide at the top, hence diametrically measuring 5.30m and 5.60m respectively. Similar is the position in respect of the upper brick-work, too. The enclosed shaft in this case increases likewise from 6.22m to 6.52m from below upwards, and as such the internal diameter of the shaft increases from 9.15m at its base to 9.40m at the top. The top of the brick work has been largely eroded but is present in the eastern part where its full height of 0.88m, through 9 courses, making a flat top, is preserved. The earthen filling rests there right upon that top. To sum up, the lower brick work serves as the basal platform which sports a broad ring wall running round the periphery. In the absence of a cross section and /or finding the outer face of the monument, it is stated that the respective width of both the brick work is not available at present, although it is conjecturable in view of the estimated diameter of the monument.

The chamber was originally intended to be covered with a single huge slab which was now found to have been broken into upward of a dozen pieces. Apparently, the pieces seem to be fitting into each other quite well, thereby suggesting its monolithic character. If that be so, it naturally surprises one as to how it was separated from the parent rock, transported and finally placed over the chamber of large dimensions. Question arises about the time and the cause of its breakage. It is very likely that the chamber which was surely meant for a mortuary ritual or for depositing of the ritual offerings which might have been made in a ceremony that was, perhaps, performed somewhere else, outside the monument. It is strongly possible that the chamber was left only with the said ritual wherewithal



and then covered with the monolithic slab, thus having a huge space lying empty inside it.

Once it was capped the area around was enclosed by both the massive brick-work which have been discussed just above. Finally, the central void, i.e. the circular shaft, enclosed within the brick-work, was filled in with loose sand mixed with stone pieces and then topped it with hard earth. It appears that the capstone under the heavy dead weight of the filling gave way and broke into pieces and collapsed and thus allowing the sand of the filling to drift in. Naturally, the earth above also subsided thus necessitating more piling up of earth which rather very hard rock dust is mixed with rock pieces, all whitish in colour. It seems that the rock powder and pieces, obtained during excavating the chamber, was kept aside to be intentionally laid at the top of the pile-up to minimize the effects of erosion. After certain depth, it became imperative to remove some of the pieces of the capstone in order to go deeper into the chamber. Most of the pieces were so large and heavy that only one of them could be removed that too with the help of two tractors working simultaneously for pulling it out. Yet the objective of fully investigating the chamber could be achieved because of the other pieces of the covering slab. We do not know what were the offering originally placed in the chamber. It is, however, very significant to note that, at a later occasion in the past, a shaft was cut from the top through the filling, perhaps, in order to deposit fresh offerings inside the chamber. But the shaft could be sunk only to a depth of 4.70m beyond which those diggers, too, failed to go deeper for the same obstruction which was confronted by us. Interestingly, those placed a fresh offering, now represented by two full pots at the depth we stopped.

Tumulus 1

Tumulus 1 is larger in size and stands on the north-western bank of the buried lake, at a distance of about 75m from Tumulus-2. In its extant form it is conspicuously hemispherical in shape. The spread of the tumulus before excavation measured 33m in diameter and 2.90 m in height from the surrounding ground level, the latter with a tendency to slope towards east and south as in case with the other one. It was subjected to probing in several spells due to its being riddled with several later additions and interventions that were made continually one after another over centuries during the later half of the third millennium BCE in particular. These later features, which were made into and upon the monument, rather haphazardly than orderly, had not only caused much damage to the surface of the monument but also brought about changes in its morphology, and rendered the excavation challenging and difficult.

Surface clearance had shown that the monument was a baffling mess of brick work and stone masonry giving little clue to its real character, excepting its location in the necropolis and on the bank of a depression, besides its hemispherical form, all indicating towards its being an imposing funerary structure. While its north-western half is largely better preserved and the brick-work all over was fairly perceptible, the counterpart housed a number of later graves and other structures made of stone. Those graves too in many cases were found cutting



into each other. The north-western part shows many successive brick courses ringing round on the slope for a considerable height (plate). The clearance has shown and suggested that the outer part of the tumulus, roughly to a height of 2m, is an orderly arranged brick work, while the remaining one meter high part with as many as eight radial walls of single brick courses, which radiate from the upper ring of brick mass and move towards the central area. One more radial wall in the south-eastern part is visible although not marked for its bricks. Beside, two or three similar walls made of single line of stones and at least two fragments of similarly made ring wall are also visible.

At least in one case a radial brick wall were restored with stone. Of all, three radial brick walls are better preserved while the others have been disturbed by later interventions to a varying degree of damage. The central part forming an oval with its longer axis being N-S was seen as a large pit making fairly flat top. In addition to all these there were number of stone built feature many of which were clearly the graves different shapes and sizes, topped with stones. All this was the phenomenon on the surface after clearance and before making deeper probing in selected area. Given to the unusual shape and complicated nature of the tumulus, a 20m long and 2m wide trench running SW-NE was laid almost two- thirds across the area, that obviously departed from the general grid plan. To begin with, the work was started from the west where the exterior face of the brick masonry has been found bearing a 10mm thick plaster of pinkish-white clay, extant to a height of 30 cm. The work when continued upwards, over the slope, ascertained a well- coursed brick work having a width of 7.50m and curving circularly in accord to the visible periphery of the hemispherical tumulus. And, further up started the zone of the radial walls, two of which were due to fall in the trench under reference.

The segment between the said two radial walls of mud-brick was chosen for excavation. The probe has revealed many interesting features: that those walls emanate from the inner face of a massive brick work that is variably extant to a height of 1m, which in fact gives the extant rise of the peripheral ring wall standing on a brick platform; that the radial walls have been built in two successive phases, with a long time gap in between; that the same walls run towards the centre on a brick-made floor that is top of the circular platform; and that the large oval pit in the centre have truncated the other ends of these walls; and also that the central pit goes down right into the rock cut chamber. To what extent the third phase caused further raising is not certain due to erosion of the surface, although it might not have brought about any substantial change in form and height. But human vandalism seems to have caused some damage by way of removing stones from the structures in order to make a small platform atop the monument-a practice still followed by the herders to keep a watch over their flocks. The presence of a large number of graves of varying sizes and shapes, and equally varying in orientation, seem to be built on the monument. Some of these stone-made graves were, perhaps, coeval with the introduction of masonry radial walls of the ultimate phase. Some of the graves are surely posterior to the latter.

The rock cut chamber, occupying the central position in the monument, mea-



asures 1.90m wide E-W and as much deeper, while its length can be traced only to 3.60m N-S at the time of the closure of the last field session (2005) when, due to time constraint, it was not possible to remove the overburden of 5m of the filling. Not unlikely that the length of the chamber may be 20 cm longer thus making it around 3.80m. If that be so, the ratio would be 1:1:2 in terms of depth, width and length as this ratio has been found in many of the rectangular graves at the site. Most significantly, the chamber contained a rich cache of the offerings of pottery and jewellery, and a part of it is still lying buried under the said heavy overburden. On present showing, pottery includes eight tall, pedestaled vases, small pots, a few medium-sized jar and dish-on-stand.

While the majority of them are plain, unslipped, undecorated and made of coarse-grained earth, a vessel with a short neck and externally projecting rim bears crimson slip and decorated with two black bands round the neck. In this case, as in case of the pottery from other graves, the general impression that one gets is that it is specially made for mortuary ritual, and hardly met with in the domestic corpus at the settlement. The jewellery consists of a solid gold bangle having incurved ends, a gold bead, agate beads and a complete necklace of large disc beads of steatite strung in a copper wire with its both ends being turned into hooks for interlocking. The offerings are found being placed on a prepared earthen bed made on the floor of the chamber, but there is no orderly arrangement in their placement.

Those are rather huddled, mostly towards north and west in the chamber. The central area, which looks like an oval pit as exposed on the surface, measures roughly 5 m N-S and 3.80 m E-W. The pit, which narrows downwards, contains above five metres of filling which consisted mainly of five strata descending right into the rock cut chamber and pertaining to three stages of filling made successively. Interestingly, there is found two sets of random rubble and sand mixed compact earth, occasionally containing pieces of mud brick as well as chunks of brick masonry. The layer at the top is made up of compact earth freely mixed with white clay. Intriguingly, the layer at the bottom, which mostly goes into the chamber, predominantly contains the random rubble which were thrown in recklessly right upon the offerings deposit on the floor of the chamber thus causing much damage to the pottery particularly that was manufactured carelessly. The mud brick chunks surely pertained to the masonry of the platform and the radial walls.

The periphery of the basal brick platform, running round the chamber, has been determined in the western part of the 2m trench which has also shown that some part of the inner face of the platform has suffered slicing off by the central pit. The exterior face of the platform bears a pleasing coat of plaster of pinkish white clay as already mentioned above. The platform is now extant with a thickness of 13.70 m and registers a height of 1.90 m through 17 brick courses rising from bed rock. The bottom course rests on a prepared bed of white clay, or else, this white clay base may be in fact the top most layer of the weathered bedrock itself, which is, moreover, made of colourful bands of petrified clay that is exposed almost around the monument. As has been said time and again, it is with the help of this valuable piece of evidence, duly fortified with other tell-tale features, e.g.



the spread of brick work exposed on most of other parts on the extrados, etc., it is concluded that the monument has a diameter of almost 30m. While arriving at this conclusion, other pointers, although infirm, like the irregular line of the central pit which is co-incidental to the inner curve of the rim wall has also helped delineate the periphery and centre of the monument.

The basal platform has have two functional, not constructional, parts: the outer part supports a 7.50 m thick peripheral ring wall, i.e. the rim; the inner part serves as the base for radial walls, which emanate from the former to run across to converge, somehow, in the centre which, however, remains elusive. Investigation has already confirmed the existence of eight mud-brick radial walls while the ninth was traceable on surface, and the tenth is conjecturable in north-western sector. In all, thus there may be ten radial walls. Nevertheless, it is wondered whether the builders intended nine radials only. Strangely enough, these walls are not symmetrically placed at an equal distance at the points of their issuing from the inner face of the rim wall, nor converge on a single common central point. Presumably, there may be more than one point where different sets of walls meet each other. Besides, every two radial walls provide a different angle at the point of joining nearer the centre.

If every two walls are allowed to join together at their respective points of convergence, the differential angles from the northern wall in a clockwise fashion seem to read in seriatim 40°, 34°, 40°, 27°, 43°, 38°, 35°, 37°, 30°, 36°, respectively. This presumes the existence of presently non-existent tenth wall, however. If there is not a single point of rendezvous it is not unlikely, these walls were somehow oriented in connection with the rectangular rock chamber under an ideological principle that governed the architecture of the whole monument. Nevertheless, and vividly, these walls run like spokes in a wheel, of which the peripheral wall makes the rim, i.e. the felly, and the symbolical construction is raised on a circular platform making the traditional *vedī*.

The radial brick walls have, as said earlier, three phases of raising, the first two with mud-brick and the last one of stone. The radial walls reveal very significant feature in that each of the two walls which have been fully exposed in terms of height and extant length, both vertically and horizontally. Both continuously rise from the rim towards the centre. In other words, as each wall moves towards the centre its courses go on increasing in number and thus attaining height. The lower one has 4 courses registering a height of 0.50 m at the point of its origin at the rim and increase to 8 courses through the height of 1.06m at the eastern end where it is truncated by the pit. Similarly, the upper wall has 3 courses registering a height of 0.27 m at the western end and 5 courses through a height of 0.50 m as of now preserved at the eastern end.

As a result, the height of the monument gradually increases towards the centre, thus imparting to the monument a perceptibly domical form. While the bricks of the first phase are made of compact yellowish clay and laid in a fine workmanship, as seen in the basal platform as well as the rim wall, those of the second phase are of loose greyish clay and coursed comparatively in inferior style. So far





Fig. 2.349: Tumulus 1 before excavation



Fig. 2.350: Tumulus 1 during excavation



Fig. 2.351: Tumulus 1 during excavation



Fig. 2.352: Tumulus 1 during excavation





Fig. 2.353: Tumulus 1 during excavation



Fig. 2.354: Tumulus 1 during excavation



Fig. 2.355: Tumulus 1 during excavation



Fig. 2.356: Plan

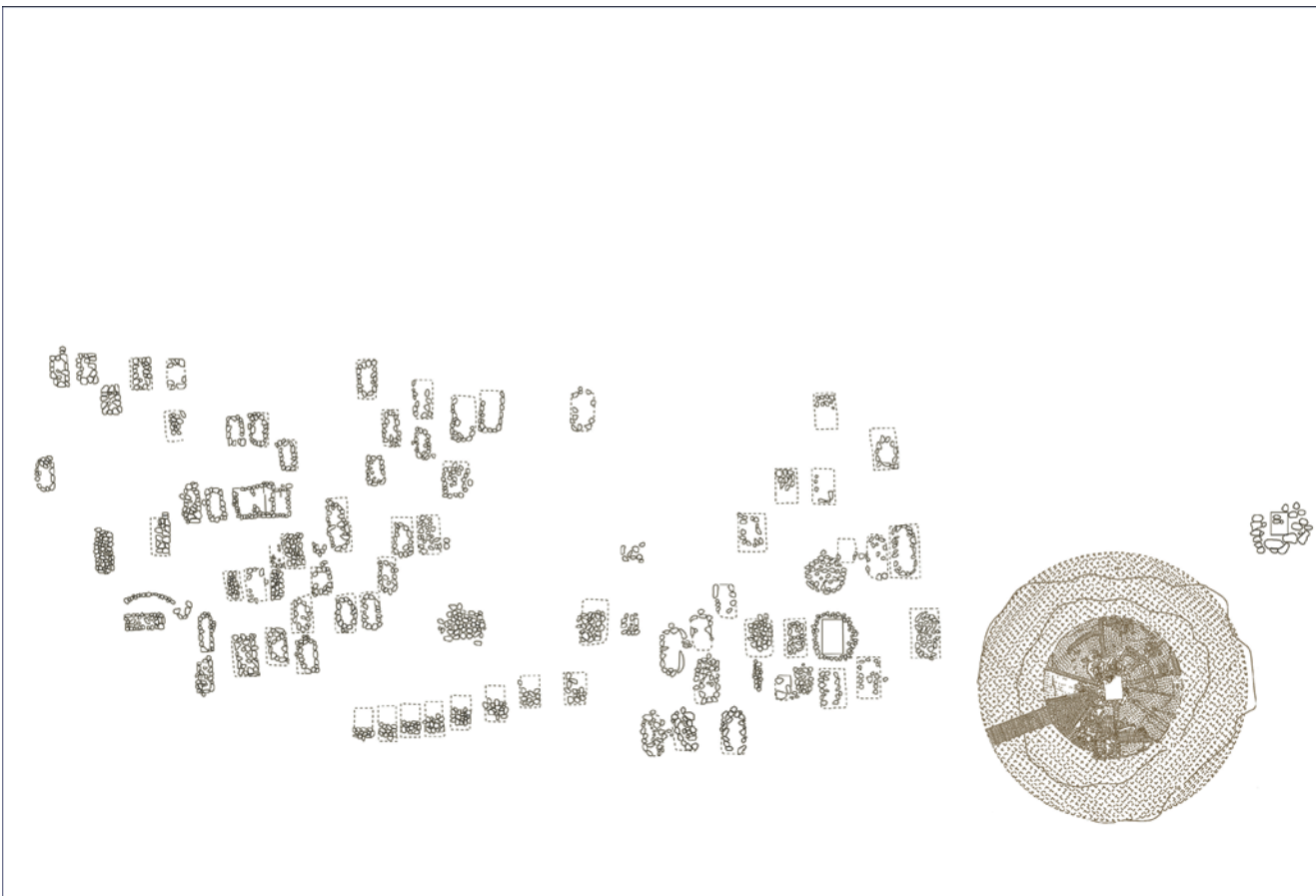
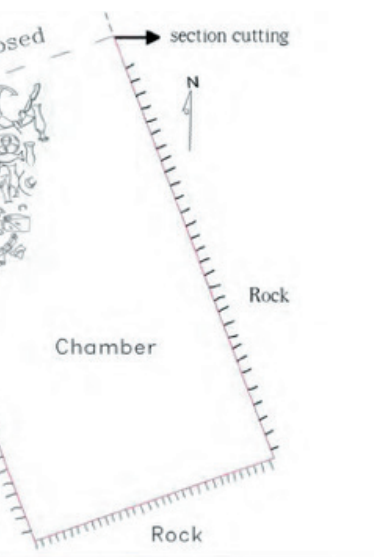


Fig. 2.357: Plan of burials, Cemetery area





n of findings, Tumulus 1



Fig. 2.358: Offering pottery and other findings from Tumulus 1

**Tumulus I, Cemetery Area
Dholavira, district Kachchh, Gujarat**

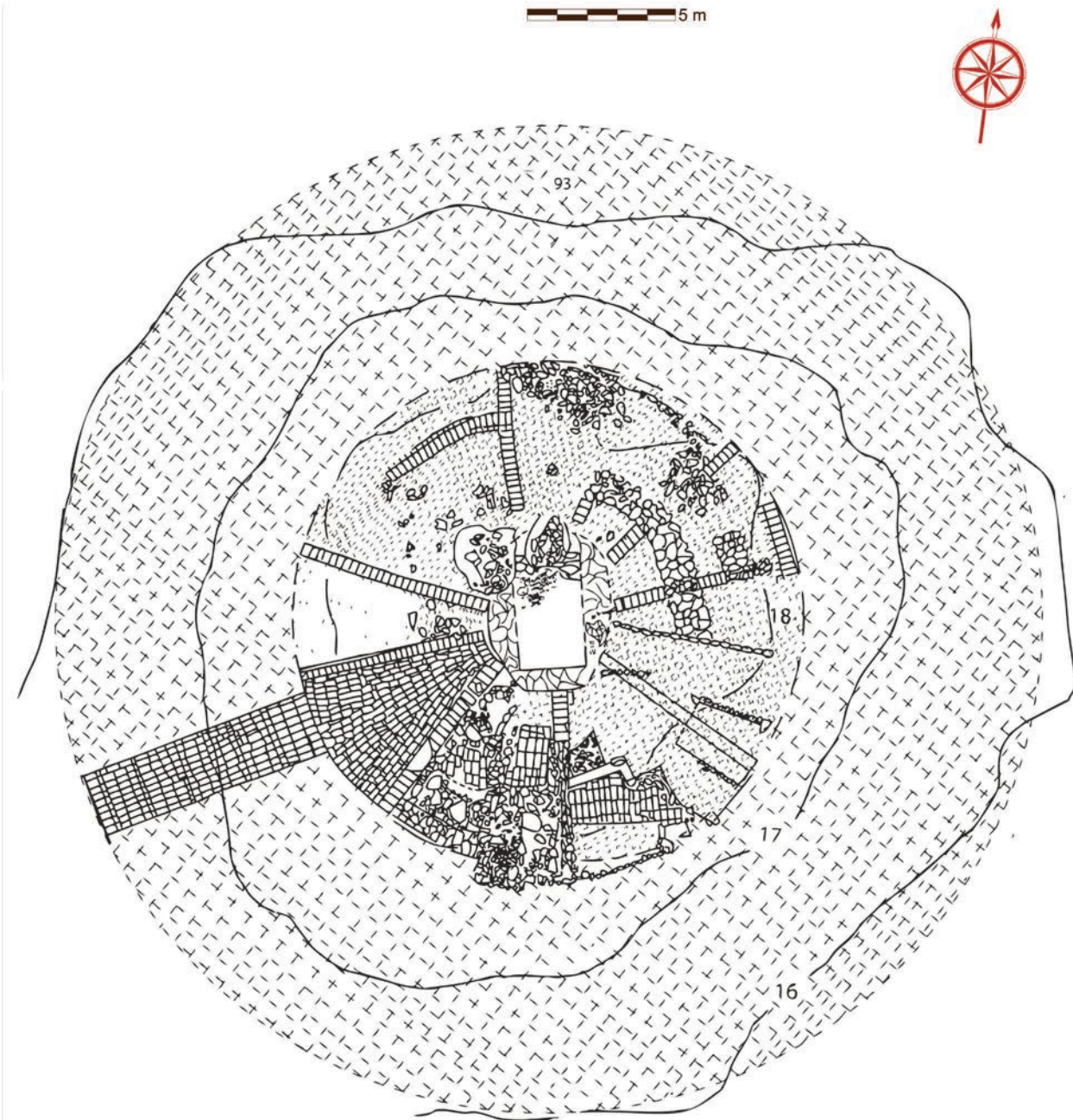


Fig. 2.359: Plan of findings from Tumulus 1

as the third raising made by using stone is concerned, it is very poorly preserved, only in segments, on account of their remaining exposed on the surface as well as poor workmanship and later pilferage. Many of them are missing as these are made of small stones placed quite carelessly. Nothing more of that phase may be added except that the majority of the graves which were built up subsequently on the monument have also disturbed these stone-made radials as well as thin ring wall, which are now present in fragments only. Filling of the interface of the walls was, perhaps, the last act.



How the central part that is disturbed by the pit was treated with is difficult to surmise. Today it is flattish. But, there arises the serious doubt whether monument was ever topped with a pile of earth as seen in the Tumulus-2. The way the radial walls have shown an upward rise on all sides, it is very likely that those were constructed right up to the top. And, in what manner the top was finished is also not easy to visualise. An interesting feature that is preserved in the north-western part of the extrados, where the inner circle, i.e. the zone of the radial walls and the filling, is seen veneered with mud-bricks. It is most plausible that the whole monument was originally treated likewise.

In its present state of preservation, the entire monument presents indeed a hemispherical form. It is difficult now to decide whether the builders intended to make it as such from the ground itself, or, the brick work of the basal platform, or this together with the felly, was raised as a cylindrical drum up to the former in the first case, or up to the latter in the second, and then the radial walls were constructed with a slight rise towards the centre and the interface was filled up in order to make a low domical top, or else the central part was kept flattened. And, finally the whole was covered with bricks and plastered.

Encasing of the dome with bricks seems to be in evidence in the north-western part where as the remaining area has been considerably tempered with. If the small part of the plastered exterior, although too low for an absolute inference, seems to be a valuable piece of evidence to suggest that the semi-circularity of the monument was intended from the beginning. If so the hemispherical exterior may have been obtained by way of externally offsetting each of succeeding brick courses while building.

Howsoever meagre is the evidence of plastering, it is, chrono-culturally speaking, highly important. On excavating at the settlement, it has been observed that the use of coloured clays, white, off-white, pink, for plastering all structures, whether a fortification wall, embankments, house walls, house floors or terraces and stands of the great grounds, was almost universal during stages II and III, and partly as well in stage I. But this practice was completely forsaken from stage IV onwards 'as if there was a social taboo or royal decree against it'. It is, therefore, obvious that the use of coloured plaster broadly serves as a cultural chronogram at Dholavira.

If the history of the monument is to be recounted, it was built in stage III, partly raised in stage IV, provided with radial stone walls and finally used to support a variety of graves during stage V. This deconstruction is duly supported by two pieces of evidence. While excavating at the site it has been observed that the people of earlier three stages were carefully choosy about the kind of earth they used for making mud-bricks. It was always a very good quality bright yellow earth. Besides they also preferred white, pink and red earth for the same purpose as well. The same care was taken for selecting right kind of earth for preparing mortar. Brick-laying is always exquisitely fine and then comes the use of colourful clays as well for plastering and flooring.



Secondly, the potsherds, collected from the brick work of the basal platform, the first phase of radial arms and the filling in the interface, pertain to stage III, while those from the subsequent structural phases relate to stage IV and V respectively. It is apparent that the **very idea of building a hemispherical or domical monument over a circular platform supporting and intricate and highly symbolical layout in honour of the dead preceded the onset of the Harappan classicism sometime between c. 2600-2500 BCE.**

Impressive form, architectural intricacy and underlying symbolism suggest that the monument was built in honour of an exceedingly important person, most probably from ruling family, and as such it was held in high esteem as suggested by phases of successive raising. Further, towards the final phase it had acquired such sanctity that it was made last home for several persons probably belonging to the same family. The Harappans got it in legacy which they cherished for sure and bequeathed to the posterity. We propose that both the monuments are made in the form of a wheel in which fire-altars as well as funerary altars were made as duly corroborated by both archaeology and literature. Furthermore we also propose to compare Tumulus-1 with *sāra-ratha-chakra chiti* and Tumulus-2 with *sapradhi-ratha-chakra-chiti*, both of which are dealt with in the *Śulba-sūtras* which contained the rules for ritual geometric constructions of the Vedic altars.

Correlation of wheel type sepulchral structures with other sites

The hemispherical monuments of Dholavira have no parallels in the any proto-historic (Harappan included) cultures in India. Most significantly, their analogies in proto-historic context have been found almost 1300 km away (as the crow flies) in the island of Bahrain in the Gulf, which has been considered the largest graveyard in the world of yore. Harappan connection with Bahrain is well established owing to the presence of seals, weights and some pottery forms 19 (Srivastava 1991: 26-27; Laursen 2010:131- 32, 134). Now the same can as well be seen in the funerary monuments in terms of morphology and, to some extent, in architectural details, of course, with some points of difference which are more related to the belief system and ritual.

The island has yielded a variety of sepulchres which have been categorised in four main types by Srivastava (Srivastava 1991:14-15), while Laursen (Laursen 2010:117-22) classifies them chronologically into early, transitional and late types with due consideration to changes in morphology. We are, particularly, concerned about the latter's 'conical' and 'radial wall types' of tumuli/tombs which have been broadly dated between circa 2200-2000 BCE by most of the archaeologists, despite the tenuous footing of the Bahrain (Dilmun) chronology of archaeological records. In the following paragraphs it may be seen that the conical monuments show much semblance to Tumulus-2 of Dholavira, those called 'Radial Wall Type' bear that to Tumulus-1.

The conical tumulus at Bahrain has a grave chamber, made of stone over ground and covered by much wider pile-up of earth mixed with stone pieces, which in



turn is enclosed by a ring wall, sometimes more than one built at different levels. In terms of diameter and height, those range from 5.45 m to 11.60 m and 0.65 m to 2.32 m respectively 22 (Srivastava 1991:45-182). The radial type tumulus also rises from the ground around a stone-made grave chamber and differs from the former on account of being furnished with radial walls emanating from the ring wall which circumscribes the whole monument and has a flattened top. Number of radials varies from 1 to 13 (Laursen 2010:120) while the diameter of this type ranges from 9.40 m to 13.43 m and height from 1 m to 1.90 m (Srivastava, *ibid*).

Both the types of Bahrain are monumental in nature, the second one, of course, being more pronounced in dimensions. Unlike the Dholavira ones, all carry skeletons, along with pottery and animal bones usually placed in position. The most significant is the find of a round seal bearing a legend in Harappan script, a peacock and a humpless bull with lowered head and typically classical Indus grooved boss at the back, which was found in the grave No. 1757 (Srivastava 1991:99, fig. 18), which was incidentally furnished with radial walls and a flattened top. Srivastava has given a general time bracket of c. 2200- 2000 BCE to the graves dug by him while Laursen is more specific in dating them between circa 2050-2000 BCE. Importantly, the solitary round seal in steatite from stage V of Dholavira has, not only the same humpless bull as motif, besides a four-letter inscription in which the last two letters (in positive impression) of the Bahrain one are almost same as the middle ones on the Dholavira specimen. These are two standing human figures and a staff. In this regard, the solitary find of the Gulf type seal from Lothal is also interesting. All these fit well in the above-mentioned time-bracket.

Contrary to Dholavira examples, the Bahrain monuments usually contain a human skeleton in flexed position, facing to the north, laid in east-west orientation, and there is no use of mud-bricks. Neither is there the basal platform nor an enormously broad ring (rim) wall. In the Bahrain tombs, the ring wall(s) are far much thinner and are made of stones, which are comparable to the similarly made stone walls of the ultimate phase, if not to the brick ones of Dholavira and yet the symbolical connotation is equally strong. It is very tempting that the inner part, showing the radial walls and the chamber in the centre of Tumulus-1 at Dholavira, intriguingly appears to be very close to what the Bahrain examples reveal (Srivastava 1991: 14).

The mound no.1812 is particularly attached with 5 or 6 subsidiary graves outside and one within the ring wall. In this regard, Fig. 6 of Laursen (2010: 120) is the most eloquent in having as many as 13 walls radiating from the central chamber to the ring wall. There are also six subsidiary graves attached to the ring wall from outside, most probably at subsequent occasions. It is not unlikely that a few of the radial walls were added by those subsequent grave builders. For conical type of tombs good example are mound numbers 1417, 1746, and 1793 (respective plate no. VIII b, XVI a, and Xx a vide Srivastava 1991).

The chronological framework given to the Bahrain tombs very well corresponds to Dholavira V, Lothal V, Nausharo IV, Harappa IIIC and so on. This was the time

when Mesopotamia was in political turmoil and the Harappan economy was under severe stress when the brisk trade between the two snapped. It is generally believed that this was the period when Dilmun (Bahrain) emerged as a strong intermediary. We would like to hazard a postulate that the Harappan merchants made Bahrain and Failaka their strong trading foothold and carried over there their mortuary practices and architecture. In the whole scheme of design of the radial wall type of tombs of Bahrain, scholars see an underlying symbolism of sun or star (Laurson 2010:120). Hereunder, we will discuss how strong has been the ideological symbolism that underlay funerary monuments in India.

Thus, the **evidence for the sepulchral structures from Dholavira clearly demonstrate the unique nature of architecture, arrangement of stone and stone slabs in a major manner incorporating in the architecture, and furthermore, the unique and exclusiveness of the tumulus or hemispherical mounds that housed the most important burials.** Nowhere else from any Harappan site such evidence of construction of a burial mound has been noticed. Further, even among the two excavated hemispherical mounds, completely new style and form of construction has been noticed, which speaks volumes of the ingenuity and uniqueness of these burials. This is also a reflection on the unique nature of cultural traditions as no parallels have been noticed except from the region of Bahrain as mentioned above. These evidences clearly indicate the cultural contacts as well as influences in certain forms of architecture, combined with the overall evidences presented above in the form of trade related items, procurement of raw materials like copper, lead, silver from regions far beyond, presence of ceramics like black slipped jar, reserved slip ware, workshops for bead making, all pointing towards brisk trade activities for which Dholavira could have been played a major role. During this process of playing several roles in the transactions, cultural assimilation also could have happened and innovative steps might have been taken in several areas like architectural endeavours, artistic traditions, script, technology, to name a few.

2.B History and Development

A synthesis of the Harappan Civilization and its major characteristic features is enumerated below to understand the context of Dholavira and findings therein.

2.B.i Introduction

The land watered by the seven rivers, which shaped the early history of Indian sub-continent, is roughly the region inhabited by the Harappans in addition to the Gujarat region. The River Sarasvati was the eastern boundary while River Indus, the western. Incidentally, this is found reference in the earliest literature of India, the *Rigveda*, which also mentions the seven rivers as Sapta Sindhavah. They are mentioned as Sindhu (River Indus), Shutudri (Sutlej), Parushni (Ravi), Ashikni (Chenab), Vitasta (Jhelum) and Vipasha (Beas). The discovery of the Indus Civilization or Harappan Civilization was first announced by Sir John Marshall on 20 September 1924 in The Illustrated London News, entitled An India “Tiryns” and “Mycenae”: A Forgotten Age Revealed. However, the history of research



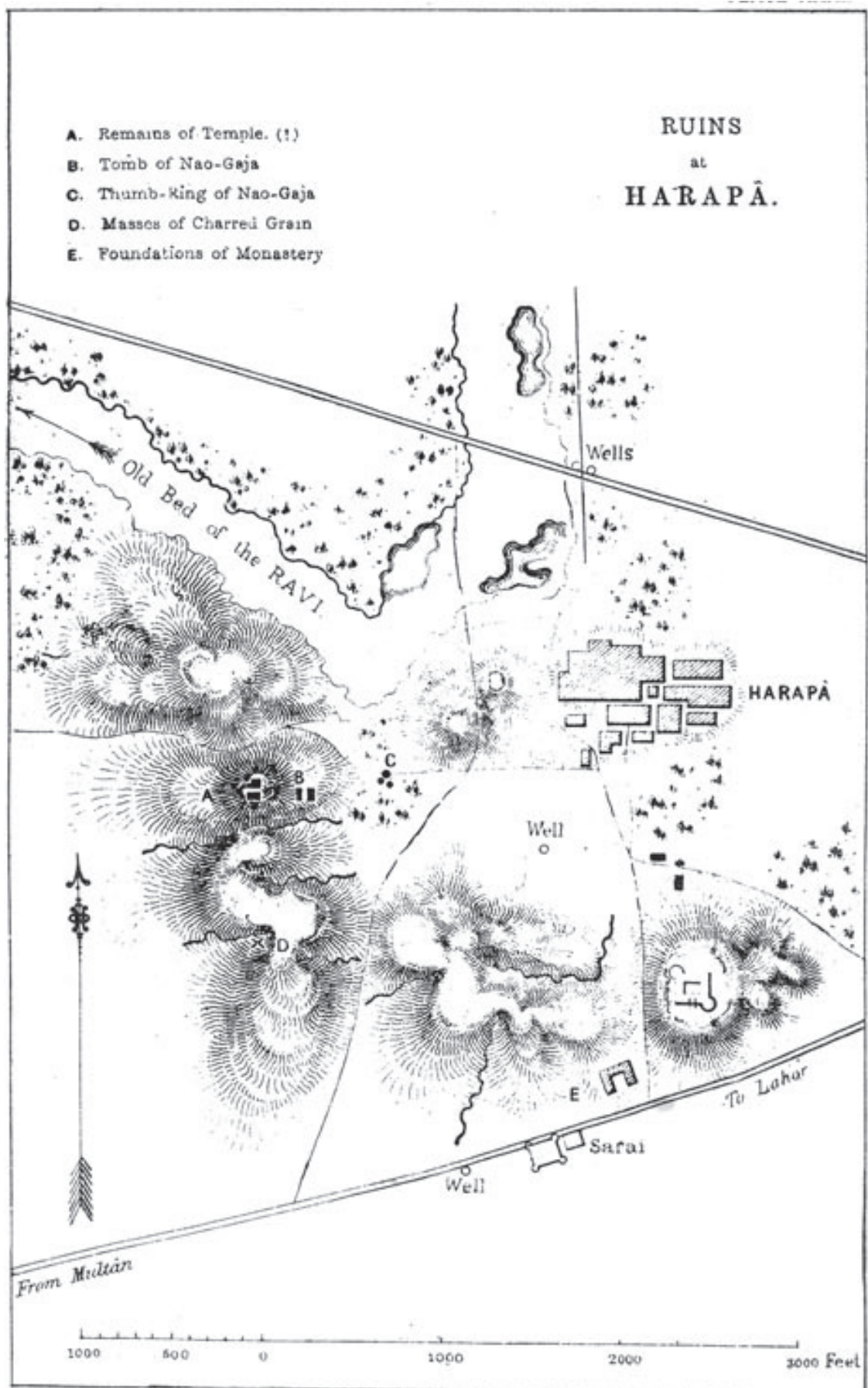


Fig. 2.360: The differentiation of various mounds at Harappa and their names (Cunningham 1875: Plate XXXII)

on the sites can be traced back to as early as March-April 1829, when Charles Masson, an American antiquarian visited the site of Harappa (Possehl 1999) and recorded the extensive ruins, including “....remains of buildings, in fragments of walls, with niches...” at the site. Masson identified the site of Harappa with Sangala of Arrian, the Greek historian. There are also attempts of identifying the city of Harappa with *Rigvedic* ‘Hariyupiya’ by Mortimer Wheeler (1947) and of Mesopotamian origin from the city of Arrapha / Arrapkha (near modern Kirkuk in Iraq) by Aravamuthan (Possehl 1999: 45). The next important account of Harappa was made by Alexander Burnes, who was on a mission to deliver some goods from the King of England to Maharaja Ranjit Singh. Burnes (1835) visited Harappa in 1834 and notes the extensive remains at Harappa, spread over 3 miles in circumference. Burnes (1835) also notes the large-scale destruction and ruins of the site due to removal of ancient bricks for the construction activities nearby. These recorded visits were largely non-academic in nature without the proper understanding of archaeology of the region. The first major documentation of the site of Harappa was carried out by Sir Alexander Cunningham, the first Archaeological Surveyor and then the Director General of Archaeological Survey of India. Cunningham (1875) visited Harappa on three occasions, in 1853, 1856 and lastly in 1875. Cunningham recalls his earlier identification of flight of steps on the eastern and western faces of a high mound and also a large square building. Further, he also observes his concern that the site faced large-scale destruction for removal of bricks for brick ballast for construction of 100 km railway line from Lahore to Multan. The earliest site plan of Harappa along with the naming of different mounds was prepared by Cunningham, which is still used today. Cun-



Fig. 2.361: Seals from Harappa (after Fleet 1912)



ningham noticed that the site extended over 4 km in circumference and the height of the mound varied from 12 – 18 m from the surrounding plains.

Cunningham (1875) identifies Harappa with Shorkot, which is equated with the city of *Po-fa-to* or *Po-fa-to-lo* of Xuanzang, wherein he stayed for nearly two months to undertake the study of Sammitiyas. Cunningham also carried out a small-scale excavation at the site. However, he could not identify the true antiquity of the site and records a few finds from the site including a pottery, square stamp seal, chert blades, ceramics and pillar base from the Nau Gaja Peer's tomb. Cunningham (1875: 108) observes the letters on the seals as not Indian letters and hence of foreign origin and also commented of its age as that of Buddha himself. He further records the occurrence of thousands of Indo-Sassanian coins from Harappa. Even though three instances of Harappan square

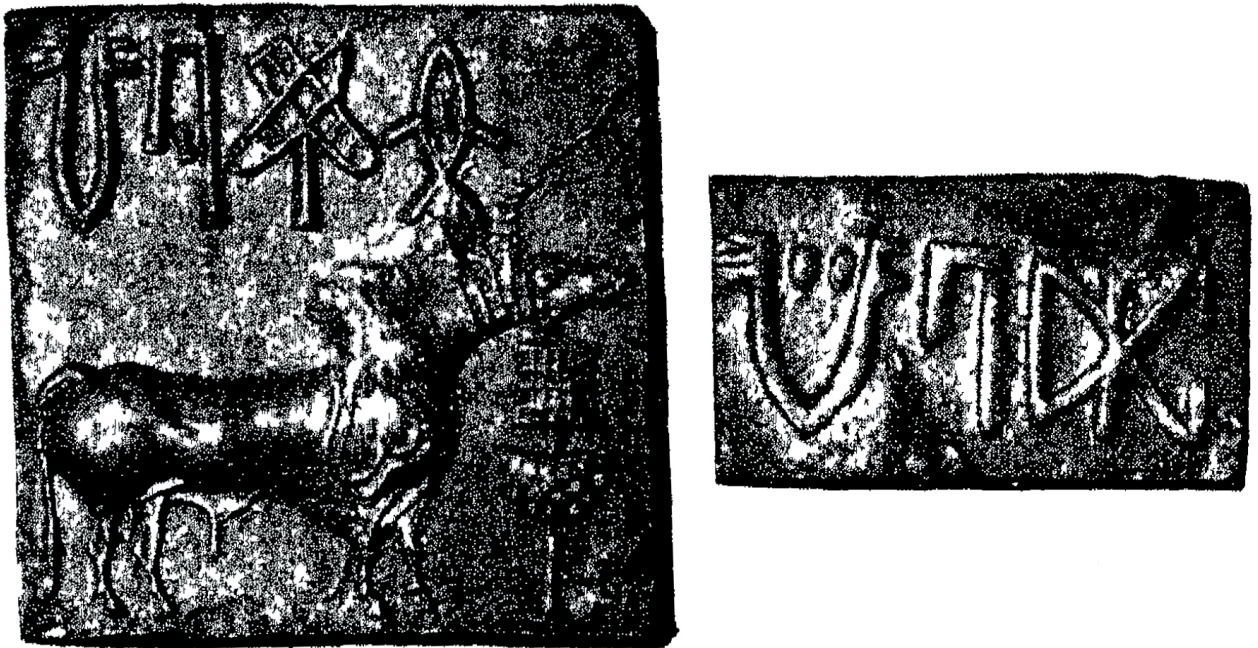


Fig. 2.362: Seals from Harappa (after Marshall 1922)



Fig. 2.363: Seal from Museum of Fine Arts, Boston (after Coomaraswamy 1929)

seals are available from the historical records, the real significance of them could not be ascertained till the discovery of the Harappan Civilization itself. The first one (presently in British Museum) was reviewed by Cunningham and said to be owned by one person known as Major Clark. Two other seals, one square and the other rectangular, were published in 1886 by M. Longworth Dames and J.F. Fleet respectively. All the three seals are now housed in the British Museum. However, the early publishers could not ascertain the significance of these seals.

All the three seals from Harappa were combined together published by J.F. Fleet (1912). Fleet observes (1912) that all the seals were made of clay stone hardened by heat. The scientific studies conducted later, in particular by Randall Law (2014) clearly indicate that most of the seals of Harappan civilization were made of steatite, heated to around 11000 C to achieve the hardness, that will enable them to survive for millennia together. The animal motif depicted in the seal was also identified variously as 'bull, but not an Indian bull, as there is no hump', 'male deer', 'cannot be a deer', Fleet (1912) also notices that the script is undeciphered. Marshall (1922) publishes two more seals from Harappa (Plate XI, Nos. 22 and 23), while the excavations at Harappa and Mohenjo-daro were being conducted, however without any cultural association of them. Marshall (1922) makes a passing reference to the seals from Harappa, depicting a variety of bull, with its stretched head over an object, as if it is to be sacrificed. He also publishes two of the seals from Harappa and identifies the script as pictographic in character. Possehl (1999) notes the identification of two more Harappan seals, the first reported by Bissing in 1927, purportedly found in Damascus in 1912. The second one came from the Museum of Fine Arts, Boston and published by Coomaraswamy (1929). Coomaraswamy (1929) describes the seal containing



Fig. 2.364: Seals and faience bangle from excavation at Harappa (after Marshall 1923)



a pictographic script, more similar to proto-Sumerian, and the animal depicted is the profile view of Indian bull and not unicorn. Coomaraswamy (1929) further notices the remarkability of the seals '*technical accomplishment and...aesthetic quality.*' While the visits to Harappa and the seals being described by various scholars, the arrival of John Marshall as Director General of Archaeological Survey of India in 1902 marked a new beginning in the history of Harappan research. The assessment on the site of Harappa for excavation was made by Pt. Hira Nanda Sastri in 1909 under P.Ph. Vogel of ASI. The assessment turned to be negative. Later, in 1914, John Marshall deputed Henry Hargreaves to Harappa, who suggested for the excavation of one of the mounds, but only after it is acquired (Majumdar 1939). The process of protection of the site of Harappa under Ancient Monuments Preservation Act 1904 was initiated with the preparation of a site plan by Daya Ram Sahni in 1916-17. However, the excavation could start only in January 1921 under Daya Ram Sahni in the Mounds F and AB, marked in the site plan of Cunningham.

Marshall made an initial assessment that the remains unearthed at Harappa belonged to the pre-Mauryan levels, which proved to be substantially true later. The Mound F revealed long parallel walls, the exact function of which could not be ascertained. These buildings were, however, are known as 'granary'. The findings of three seals, all having the same animal motif were also discovered from pre-Mauryan contexts, and also faience bangles (Marshall 1923). While the site of Harappa was under continuous assessment and reporting since 1829, D.R. Bhandarkar discovered Mohenjo-daro or Moenjo-daro, on 26th March, 1912, the first accounts of which could be found in the Progress Reports of Western Circle of ASI (Bhandarkar 1911-12). The initial assessment of the site by Bhandarkar, was however not impressive and he expressed his disappointment. However, he noticed that the site is massive and extends over $\frac{3}{4}$ th of a mile. R.D. Banerji inspected Mohenjo-daro (Mohenjo-daro) during 1920-21 and notices that even though the mound covers an area of over 2 miles, the height and extensive nature of the remains is well known in the neighbourhood, it did not attract much of the attention (Banerji 1921). Banerji (1921) further noticed that the site consists of vast mounds surrounded by smaller ones, the main mound rising nearly 80 – 90 feet, covered with debris and brickbats. He also notices that this mound measured 600 X 200 feet and is subjected to extensive brick robbing by the nearby villagers, who reported that the digging indicated presence of huge platforms and smaller circular structures, which was identified as votive stupas, as this mound is marked by the remains of a vast stupa, of which only the shell existed. Banerji (1921) also noticed that the stupa of this mound is the largest in Sindh and also larger than those at Depar Ghangro or Mirpur-Khas.

Banerji, later noticed that the presence of chert implements inside large jars with pointed base, along with human relics and associated goods (Possehl 1999). Banerji also noticed that the chert scraper of the type of neolithic or sub-neolithic implement clearly indicated the steep antiquity of Mohenjo-daro. This also prompted Banerji to start excavation at the site immediately. The excavation of Banerji (1926) at Mohenjo-daro initially concentrated on the stupa mound, which was exposed to a larger extent. Banerji (1926) further notices the excavation



at Site No 1 (Main Mound, containing the stupa), which brought to light “...*flint (chert) scrapers, cores, bouchers, dice of polished marble and terracotta...oblation vessels of conch shells, bangles and ornaments of conch, beads of various stones, copper and bronze, pipes of cornelian and pottery of various shapes.*” He also found a series of pointed based urns, which contained “...*smaller pointed funeral urns and miniature necropolitan pottery.*” The most prominent findings reported by Banerji were the soapstone seals, the motifs and ‘ideograms or pic-

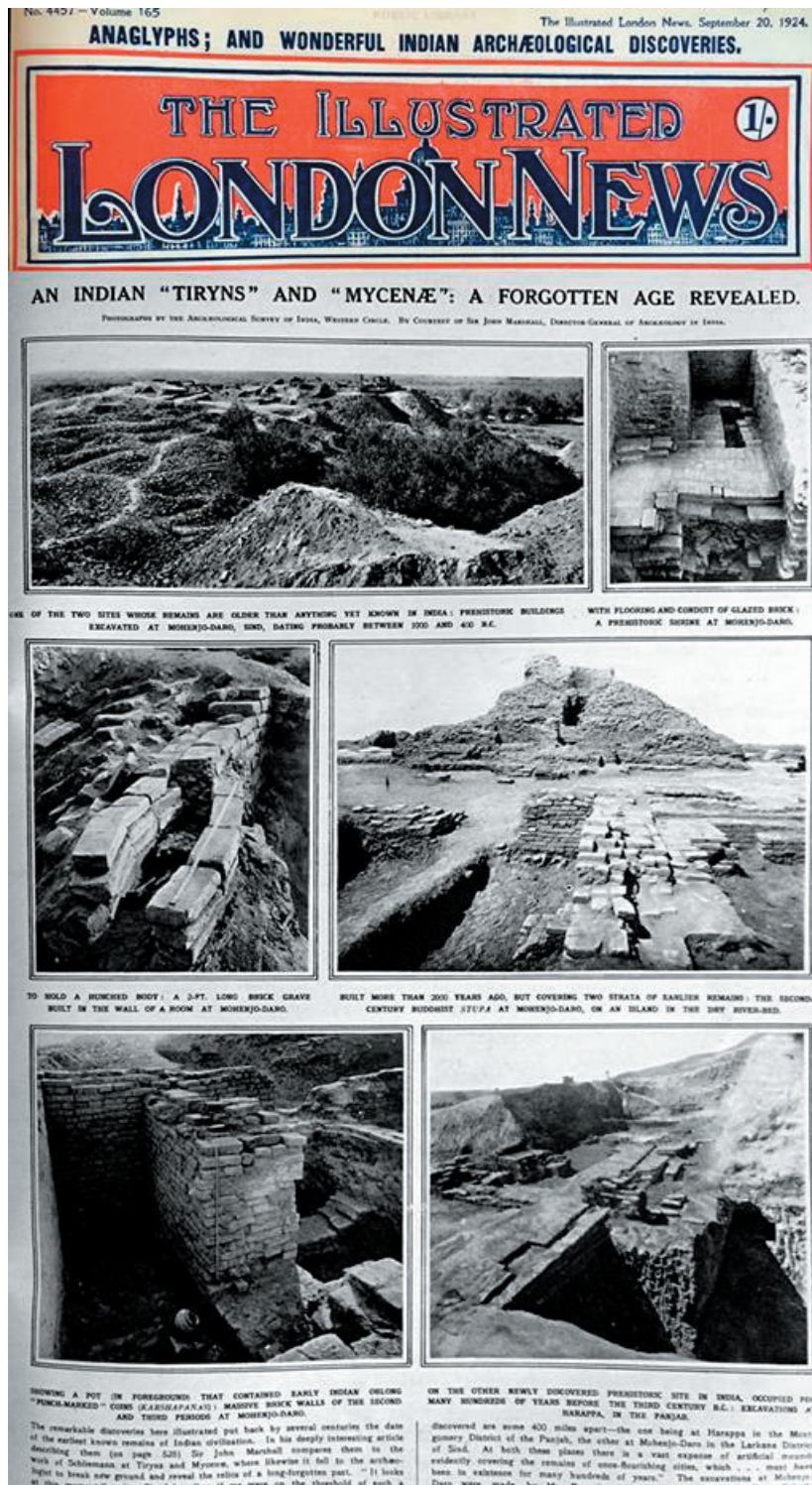


Fig. 2.365: Announcing the discovery of Harappan Civilization, Illustrated London News, September 20, 1924



tograms' very much similar to those from Harappa. The excavations at Mohenjo-daro were continued by M.S. Vats (1922-23) and K.N. Dikshit (1923-24), which enabled the better understanding of the findings (Mackay 1934).

Marshall (1926) noticed the important discoveries being made at Harappa and Mohenjo-daro and credits R.D. Banerji entirely for making the discoveries at this site and the subsequent findings. Marshall (1926) arranged for the inspection of artefacts and other findings from these two sites in the summer of 1924 at ASI headquarters and immediately recognises "...same stage of culture and approximately to the same age and that they were totally distinct from anything previously known to us in India was at once evident." Marshall (1924) published the findings in The Illustrated London News (September 20, 1924) announcing the discovery of an ancient civilization. This announcement was followed immediately by the observation of Prof. A.H. Sayce (1924) in the next issue of The Illustrated London News (September 24, 1924), citing similar seals from datable contexts of c. 2600-2300 BCE from Susa, southern Mesopotamia. Sayce (1924) also points to the period extending from King Manistusu (B.C. 2600) to Third Dynasty of Ur (B.C. 2300) and even suggested the "...intercourse between Susa and the North-West of India." In the subsequent issue dated October 4, 1925, S. Smith and C.J. Gadd, further substantiated the similarities between pictographic script and antiquities found in Mesopotamia and North-West India (Mackay 1925).

Mackay (1934) further noticed the strategic location of Mohenjo-daro, which could have enabled important trade contacts with the northern India, and also with Mesopotamia and Persia through the Persian Gulf. Mackay (1925), further describes the find of a Harappan square seal from the Sumerian levels at Kish in 1923, which had an extra hole across the boss, due to its extensive use, and its similarities with Susa and Harappan finds. Subsequently, in 1923-24 and 1924-25, the excavation in the Kish (Mackay 1925) graves also brought to light "...number of bead necklaces, mainly of carnelian and lapis lazuli", "...few of the carnelian beads...decorated in a curious manner...traced in white on the red ground." This clearly indicated the hallmark decorated carnelian beads of the Harappans, which is also an important export item during third millennium BCE.

Marshall (1927) notices that the prehistoric civilization of the Indus "...was no mere provincial offshoot of Mesopotamian culture, but was developed for countless generations on the banks of the Indus itself and its tributaries, is becoming more and more manifest..." The first site plan of Mohenjo-daro was also published by K.N. Dikshit based on the excavations carried out up to 1924-25 (Dikshit 1927). The excavation during 1924-25 at Site E (in lower town) brought to light among other cultural vestiges, two complete carnelian necklaces placed inside copper jar, one with nine compartments of five carnelians in each and the second with seven compartments of six carnelians in each (Dikshit 1927). The jar also contained gold and silver ornaments along with stone beads. The remarkably larger number of terracotta human figurines, with female ones outnumbering male figurines is also an important find.

During the year 1925-26, Marshall was himself present at Mohenjo-daro, which also enabled him with the discovery of 'Great Bath' (Marshall 1928). The re-



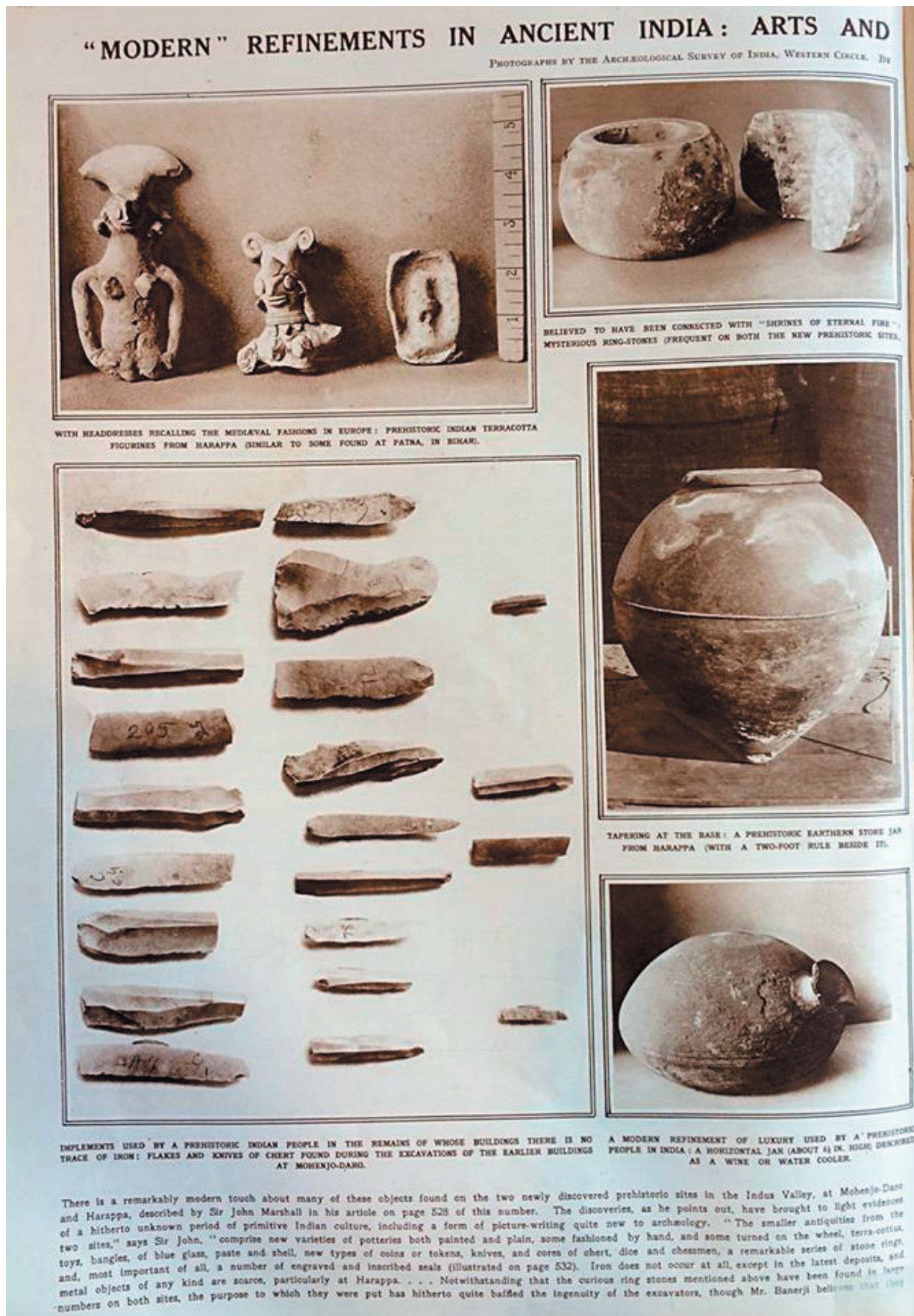


Fig. 2.366: Findings from the excavations of Harappa and Mohenjo-daro, Illustrated London News, September 20, 1924



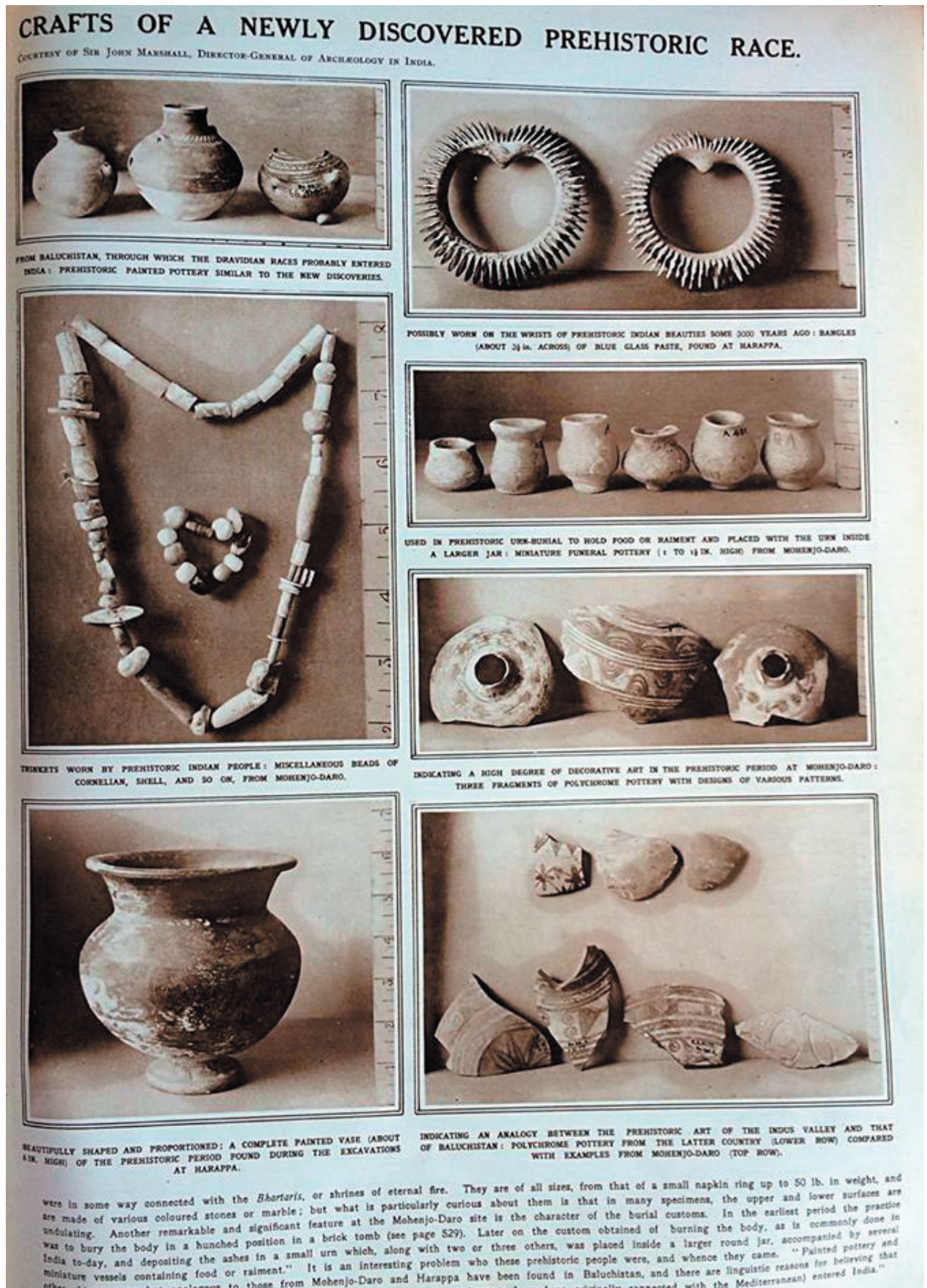


Fig. 2.367: Findings from the excavations of Harappa and Mohenjo-daro, Illustrated London News, September 20, 1924

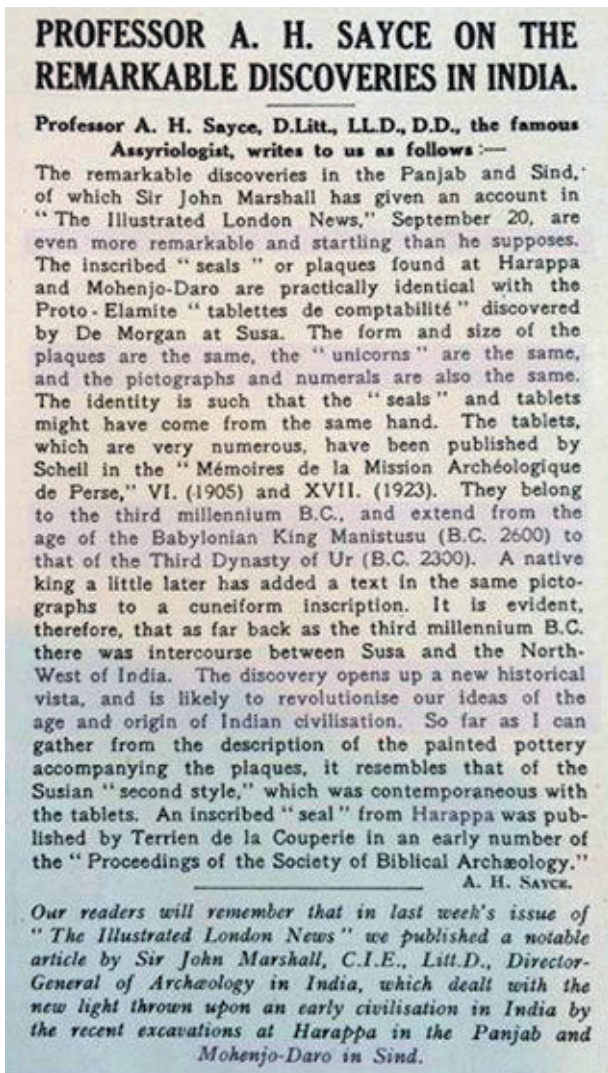


Fig. 2.368: Annoucnement of Prof. A.H Sayce

carnelian, chalcedony, to name just a few. These characteristic specimens of Harappan Civilization is also found at Harappa, which enabled the identification of similarity of these cultural material and ultimately lead to its discovery and announcement to the world. While the Harappan Civilization was being discovered, interested travellers and persons of divergent disciplines were visiting other sites of equal antiquity. Even though another major site, Kalibangan was noticed as early as 1820s by Lt. Col. James Tod and later in 1917 by Luigi Pio Tessitori, its association with the Harappan civilization could not be understood as it did not yield any stamp seal. Tessitori carried out a small-scale excavation at Kalibangan, whom he called as 'Kali Vangu' and 'Kali Banga' in his reports.

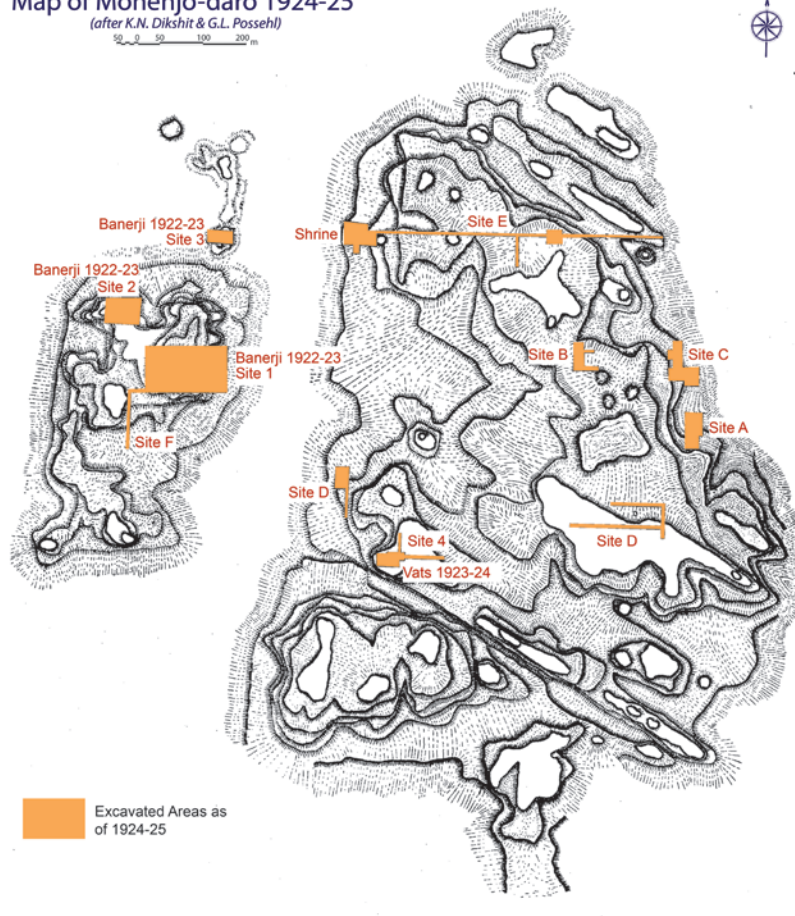
Similarly, Major E. Mockler noticed the site of Sutkagen-dor in 1875. This site is considered as the western most Harappan site. Mockler also conducted an excavation at the site and brought to light remains of houses of baked bricks, pottery, stone implements, copper pieces, bones and charcoal. Aurel Stein visited the site in 1928 and later in 1932. Another site that attracted the attention of archaeologists is Dabar Kot, which was discovered by Dr. Fritz Noetling of Geological Survey of India in 1898. Noetling also visited other sites in the vicinity like Periano Ghun-

mains of bitumen "...in the recesses at each end of the treads in the flight of steps descending into the tank..." as a 'damp proof course' along with the high degree of execution in the construction of the tank has been noted specially by Marshall (1928). This season also brought to light the so-called 'Priest King' from the DK-B area. A characteristic feature of the architecture of the houses at Mohenjo-daro is noticed as the inward batter of walls on each side of the street (Mackay 1934).

Among the most characteristic features of Mohenjo-daro include (Mackay 1934), double storeyed houses, upper one reached by a flight of steps with narrow treads, elaborate drainage systems, storm water drains, steatite / soapstone vessels with affinity to those from Susa, decorated carnelian beads, typical ceramics, seals of high workmanship, cylinder seals of Sumerian type, abundant use of copper and bronze, cubical weights, beads of stones like agate,



Map of Mohenjo-daro 1924-25
(after K.N. Dikshit & G.L. Possehl)



dai in 1897 and Rana Ghundai in 1898. Aurel Stein, who visited the site in 1904, first anticipated the antiquity of Dabar Kot comparable to that of Mohenjo-daro. The other important site, which was excavated while Mohenjo-daro and Harappa were being excavated, is Nal in 1925 by H. Hargreaves. The site of Mohenjo-daro was excavated up the 1931-32 field season.

Fig. 2.369: First plan of Mohenjo-daro drawn by K.N. Dikshit

in the DK-G area in 1932 by K.N. Puri of the Mohenjo-daro Museum, which could lead to some of the lowest levels, and later continued by and described later by Q.M. Moneer. K.N. Puri again excavated the DK area in 1936-37, which among the prominent finds included a large cache of beads, weight and copper weighing pan indicating the possibility of a lapidary shop. Another excavation in 1938 by one A. Rahman brought to light a brown limestone head. During 1928, the trial excavation at a site known as Jhukar in Sindh by N.G. Majumdar on the initiation of John Marshall brought to light archaeological deposits named as Early and Late Jhukar, below the Kushana levels. These strata were later identified with Mature Harappan and Late Harappan based on the style of pottery. Mohenjo-daro was conducted for extensive surface documentation under the Aachen /IsMEO Project by Michael Jansen, during which period a few workshop areas including a stoneware bangle manufacture area were extensively.

The site of Harappa was continued with excavations carried out at different parts of the mounds, e.g. Mounds AB, F, G, J and H, the latter representing the late Harappan cemetery. K.N. Sastri discovered the Cemetery H in 1927 after a heavy downpour, which exposed the top portions of several burial jars. Another remarkable discovery in 1937 by K.N. Sastri brought to light the cemetery of mature Harappan period. This cemetery came to be known as R-37 and four seasons of excavation by Sastri and later by R.E.M. Wheeler in 1946 helped in

understanding of the important cemetery of the Harappan times. The excavation at Harappa continued with intermittent gaps in between, Wheeler excavated the areas across the fortifications in Mound AB, and Cemetery R-37 while also explored the stratigraphical relation between the Cemeteries H and R-37 (Wheeler 1947). Later, M. Rafique Mughal carried out the excavation at Harappa in 1966 at the Cemetery R-37 and from 1986 onwards George F. Dales initiated an extensive project under Harappa Archaeology Research Program (HARP), which continued up to 2002 under various directors, viz., Richard H. Meadow, Rita P. Wright, J.M. Kenoyer.

Another important site that was excavated is Rangpur by M.S. Vats in 1934, wherein he proposed the chronology between the 'Indus Valley sites' and 'Cemetery H' at Harappa, based on the ceramic shapes and styles. Rangpur was again excavated by G.S. Ghurye in 1936, M.G. Dikshit in 1937 and S.R. Rao from 1953-54 to 1955-56. Chanhudaro, which is located 128 km southeast of Mohenjo-daro was subjected to excavation under the direction of E.J.H. Mackay from 1935 to 1936. The site turned out to be an important centre for craft activities like bead manufacturing and square seals (Mackay 1943). Apart from the mature Harappan levels at Chanhudaro, the site also revealed evidence of Jhankar culture. Towards the beginning of 1947, when the partition divided India into two countries, Pakistan carved out from the former, the broad understanding of the civilization emerged, mainly from the excavations at Harappa, Mohenjo-daro and Chanhudaro. Marshall describes the civilization sharing remarkable uniformity, which among others, included *"...domestication of animals, cultivation of wheat, barley and other grains, growing of fruits, irrigation by canals, building of houses, organization of society in cities, spinning and weaving of textiles and dyeing them in various colours, the use of the potter's wheel and the decoration of wares, river navigation, the use of wheeled vehicles, the working of metals, writing, fashioning of ornaments from faience, ivory, bone, shell and semi-precious stones"* (Marshall 1931).

The Indus script was an enigmatic aspect of the newly discovered civilization that already invited four attempts of decipherment by 1931 including attempts on the line of Sumerian, Proto-Elamite, Minoan and Hittite. Marshall also summarised the possibility of multiple language groups within the civilization, was pre-Vedic in nature and also a possibility that it included Dravidian groups. Marshall identified several evidences of religion in the form of Mother Goddess, represented by figurines; Pasupati or Proto-Siva, various icons or gods on seals. He also identifies possible cult stones, both from Harappa and Mohenjo-daro, which included phallic, baetylic and the yoni ring stones. The civilization also had extensive contacts with the Mesopotamian world as attested from the findings of similar objects as identified by A.H. Sayce, Sydney Smith and C.J. Gadd. Another important aspect emerged from the writings of Marshall is that no evidence of warfare or internecine conflict was present in the Indus civilization.

The partition of India in 1947 saw all the excavated and well known Harappan sites excluding Rangpur went to Pakistan side and India. A series of reconnaissance surveys during the post-independence period starting with S.R. Rao, and



followed by A. Ghosh, J.P. Joshi of Archaeological Survey of India and several universities including M.S. University, Vadodara; M.D. University, Rohtak brought to light a host of sites on the Indian side. On the Pakistan side, the important surveys include those by F.A. Khan, Rafique R. Mughal, the surveys in Cholistan area of the latter particularly brought a paradigm shift in the understanding of the Harappan Civilization. Further, the investigation in the Balochistan region by the French Archaeological Mission at the sites of Mehrgarh, Nausharo, Pirak and Sibri and by the German Archaeological Mission at sites of Miri Qalat, Sohr Damb / Nal helped in the better understanding of the formative phases of the Harappan civilization.

2.B.ii Terminology

The earliest concept on the time bracket for the Harappan Civilization could not go beyond 'many hundreds of years prior to the third century BCE' (Marshall 1924). Further, Marshall used the term Indo-Sumerian Civilization for the findings from Harappan and Mohenjo-daro owing to the assumed assumption of Sumerian influence over the culture. However, Marshall dropped the term 'Indo-Sumerian' in 1926 and adopted the term 'Indus Civilization'. Further, Possehl (1999) points out that Marshall used the term 'Indus Civilization' and not 'Indus Valley Civilization' for the culture. The earliest attempt to describe the culture as 'Harappa Culture' was by E.J.H. Mackay, taking into account the type-site of Harappa (Possehl 1999). Another term used by scholars was 'Proto-Indian', which was first coined by G.R. Hunter and later used by M.S. Vats after his excavation at the site of Rangpur in Gujarat. As more and more sites were discovered in different parts of western and northwestern India and a large concentration of sites were found along the dry beds of River Ghaggar-Hakra, which is identified with River Sarasvati, the term 'Indus-Sarasvati Civilization' was also proposed by few scholars.

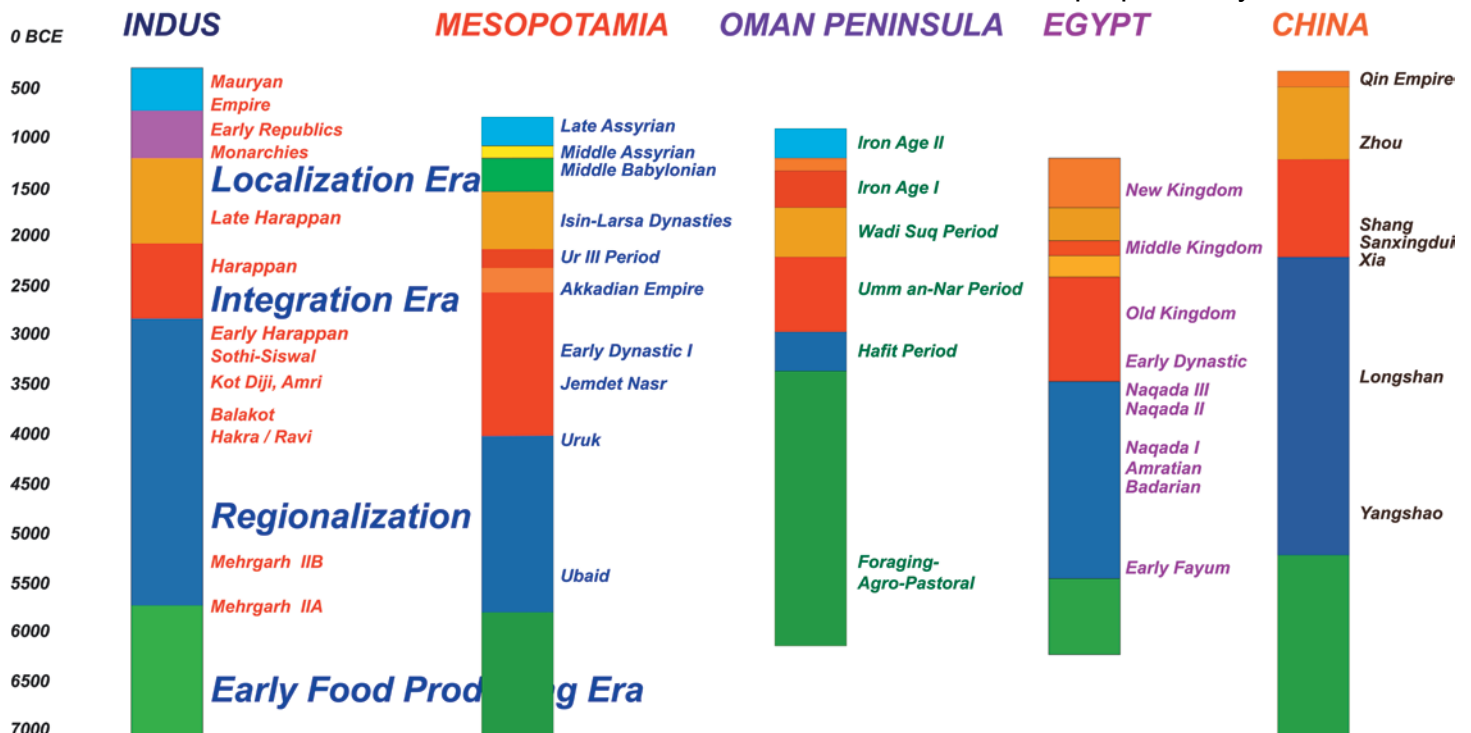


Fig. 2.370: Chronological framework of contemporary civilisations with Harappan culture

However, Harappan sites are also found in large parts of Gujarat, Balochistan and other areas, far away from the Rivers Indus and Ghaggar-Hakra system. At present, the term 'Harappan Civilization' is widely accepted terminology for describing the Bronze Age culture flourished during the third millennium BCE, after the type-site of Harappan, in which the first excavation was carried out.

The term of 'early and pre-Harappan' is used for the cultures that stratigraphically preceded the Harappan culture. R. Mughal (1988) proposed that the term early Harappan is more suitable for the culture preceding the Harappan culture at the site of Kot Diji, based on the cultural continuity represented by the material culture present both in the early as well as mature Harappan cultures. The term 'early Harappan' is also widely accepted for the cultures preceding the Harappan culture, which is defined by the regional chalcolithic cultures in different regions. These regional chalcolithic cultures are identified again based on the type sites and thus, for the time period preceding the c. 2600 BCE, the different cultures are Amri (Sindh), Kot Diji (northern Sindh, Cholistan and Punjab), Sothi-Siswal (Rajasthan, Haryana and Punjab), Nal (Balochistan) and Anarta (Gujarat).

The Harappan culture also represents the urban phase of the long drawn cultural processes that survived for well around 700 years, starting from c. 2600 BCE and ending around c. 1900 BCE. Posterior to c. 1900 BCE, the archaeological evidence indicate a transformation in the cultural process represented by deurbanised phase of the Harappan culture, known as 'late', 'post-urban' or 'post-Harappan' also indicating some continuity from the preceding Harappan culture. These late Harappan cultures are represented at the type-sites of Jhukar-Jhangar (Sindh), Cemetery H-Harappa (Punjab-Rajasthan), Bara (Haryana, Punjab and Western U.P), State VI of Dholavira in different domains.

2.B.iii Chronology

The chronology of the Harappan Civilization is being revised based on the discoveries made since the very beginning. The earliest proposition was made by John Marshall (1931), who based on the discovery of Harappan artefacts from Mesopotamian sites like Ur and Kish, proposed them to be equivalent to the Intermediate Period at Mohenjo-daro and hence placed the civilization from c. 3250 to 2750 BCE. The chronology was revised by Wheeler (1953) with a time bracket of c. 2500 – 1500 BCE, the terminal date of which was revised later to c. 1700 BCE. These dating methods were entirely based on the relative dating techniques, as the absolute dating techniques were not still available for the archaeologists. The advent of radiocarbon dating techniques since the late 1940s enabled the archaeologists to refine the chronology of not only the Harappan culture but also the preceding formative phases starting from the food producing stages (Neolithic), regional chalcolithic cultures and also the late Harappan cultures.

The excavations at the sites of Mehrgarh, Nausharo, Pirak, Sibri, Sohr Damb / Nal, Miri Qalat, Kalibangan, Rakhigarhi, Dholavira, Harappa and a host of several other sites spanning over a period of over 7000 years and their dating using radiocarbon techniques has enabled the refinement of chronology. Further, con-



tacts of the Harappan culture with those in modern Oman, Iraq, Syria, Iran during the third millennium BCE and the chronology from these sites have also helped in refining the chronology. Thus, the chronological framework is now possible based on the radiocarbon dates and archaeological evidences from several sites.

Further, the cultural framework and chronology of the Harappan Civilization has been researched upon by several archaeologists and they have proposed them as follows (Possehl 1999):

Stages	Phases	Chronology
STAGE ONE	Beginnings of Village Farming Communities and Pastoral Camps Kili Ghul Mohammad Phase Burj Basket Marked Phase	7000-5000 BC 5000-4300 BC
STAGE TWO	Developed Village Farming Communities and Pastoral Societies The Kechi Beg and Hakra Wares Phases are thought to have been generally contemporaneous. Togau Phase Kechi Beg Phase Hakra Wares Phase	4300-3800 BC 3800-3200 BC 3800-3200 BC
STAGE THREE	Early Harappan Four Phases believed to have been generally contemporaneous Amri-Nal Phase Kot Dijian Phase Damb Sadaat Phase Sothi-Siswal Phase	3200-2600 BC 3200-2600 BC 3200-2600 BC 3200-2600 BC
STAGE FOUR	The Early-Mature Harappan Transition	2600-2500 BC
STAGE FIVE	Mature Harappan Five Phases thought to have been generally contemporaneous Sindhi Harappan Phase Kulli Harappan Phase Sorath Harappan Phase	2500-1900 BC 2500-1900 BC 2500-1900 BC
STAGE SIX	Post-Urban / Late Harappan Jhukar Phase Early Pirak Phase Late Sorath Harappan Phase	1900-1800 BC 1800-1000 BC 1900-1600 BC

Stages	Phases	Chronology
	Lustrous Red Ware Phase	1600-1300 BC
	Cemetery H Phase	1900-1500 BC
	Swat Valley Period IV	1650-1300 BC
	Late Harappan Phase in Haryana and western Uttar Pradesh	1900-1300 BC
	Late Harappan-Painted Grey Ware Overlap Phase	1300-1000 BC
	Early Gandhara Grave Culture Phase	1700-1000 BC
STATE SEVEN	Early Iron Age of Northern India and Pakistan	
	Late Pirak Phase	1000-700 BC
	Painted Grey Ware Phase	1100-500 BC
	Late Gandhara Grave Culture	1000-600 BC

2.B.iv Geographical Setting

The initial discovery indicated that the civilization is present only at a few sites like Harappa, Mohenjo-daro, Chanhudaro and Rangpur. However, over the period of several decades, it has been observed that the Harappan sites along with the sites of formative and degenerative phases are spread across an area of nearly one million sq. km. in diverse geographical settings. The geographical setting of the large number of Harappan sites indicate their close alignment along the Indus river and its tributaries and Ghaggar-Hakra-Sarasvati rivers running parallel to the River Indus. While the River Indus originates in the higher Himalayas, several of its tributaries also emerge to its east and west and flow across the western edge of a vast alluvial plain. The prominent western tributaries are Rivers Gomol, Kabul and Bolan, which also serve as important transitory passageways to the plateaus of Balochistan. During the course of journey, the River Indus is joined by major rivers like Rivers Beas, Ravi and Sutlej, which contribute enormously for the water flow. The river terminates in a highly marshy area near Karachi. The evidence of ceramics and beads similar to early Harappan types from the Neolithic site of Burzahom in Kashmir valley is a clear indication of the role of river valleys for contacts with the interior uplands and forested areas of Himalayas.

The River Sarasvati system along with several tributaries, the prominent among them are Rivers Drishadvati, Markandeya and others, run almost parallel to the River Indus after the former enters the Cholistan area. It has been proposed by several scholars that the River Sarasvati drained into the Rann of Kachchh, a vast salty marshy area in the northern part of Kachchh district of Gujarat. The tributaries of River Ghaggar are Dangri Nadi with its branch Bagliarli Nadi on the east; Patialewali Nadi with its tributaries in upper stream Patiali Rao and Choa Nadi to the west. The other smaller rivers to the west of Patialewali Nadi are Jahmbowah Choi and Jainta Deviki Rao.

The satellite images also indicate that the River Sutlej joined the River Sarasvati system, thus contributing a major share of water flow, before it joined the River



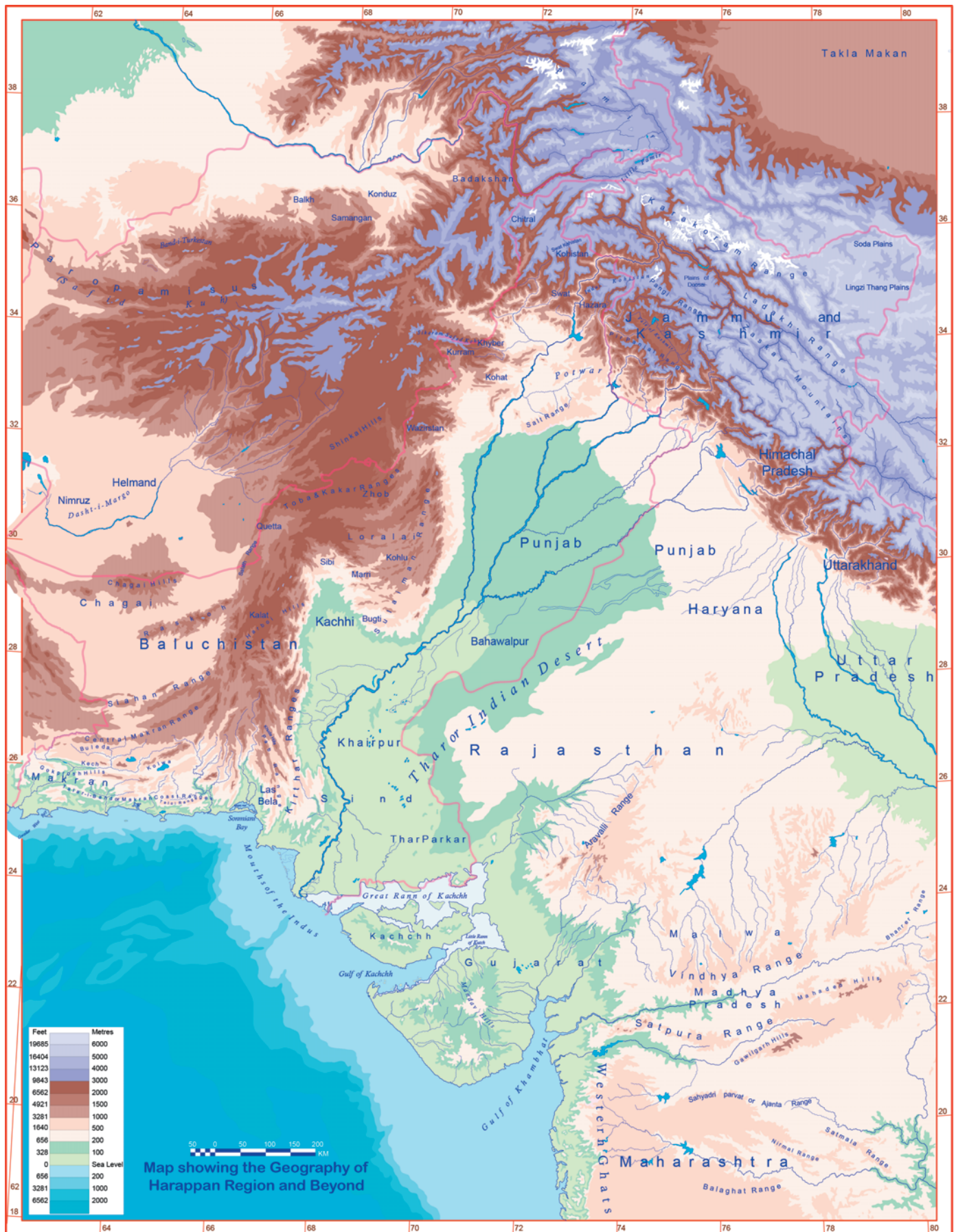


Fig. 2.371: Geography of the Harappan Region and beyond

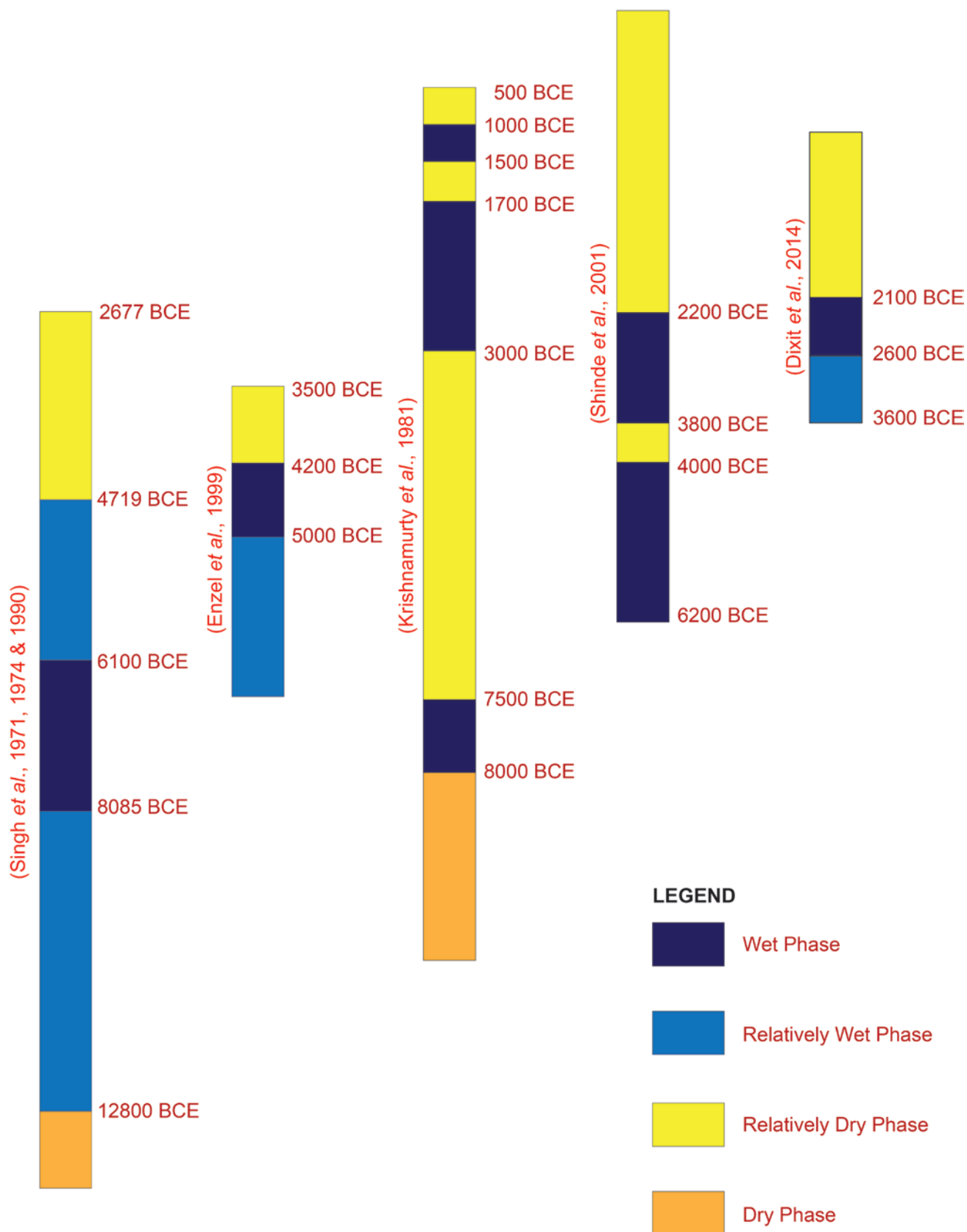


Fig. 2.372: Results of palaeoclimatic studies and Harappan civilization

Beas system during the second millennium BCE. The traces of old river channels represented by Naiwal, Eastern Naiwal and Western Naiwal have been a subject of closer study since the second half of nineteenth century by geologists



like C.F. Oldham (1874, 1893) and R.D. Oldham (1886).

The river plains are surrounded by mountaineous ranges on the west, north and northeast of the Himalayan ranges, while on the southeast it is bordered by the Aravalli ranges in Rajasthan and Haryana, which provided an excellent source of raw materials like copper, silver, lead, steatite among others. Immediate to the west of River Indus on the southern Sindh is the Kirthar mountain ranges of Balochistan, which gradually rises and forms a low high plateau, that extends into the entire modern Balochistan and further into Afghanistan. The Sulaiman mountain ranges border the River Indus in the middle part corresponding to the unified channel of five rivers. The northwest, northeast northern regions are bordered by the mountain ranges of Pakistan, Afghanistan and India. The Makran coast and the rugged Makran coast range border the western part of lower Indus. The southernmost Harappan region is characterised by the Kachchh region consisting of several islands during the third millennium BCE, including the mainland Kachchh. Further south is the Gulf of Kachchh and Saurashtra, which connected to the thickly forested areas and mineral rich resources of southern Gujarat.

2.B.v Climatic Settings

The recent palaeoclimatic studies using scientific proxies have helped in the reconstruction of climatic conditions during the third millennium BCE. In particular, using the stable isotopes of carbon and oxygen from the various sources like lakes, peat bogs, ocean floors, floral records and phytoliths have been particularly helpful. The various attempts by scholars working on the palaeo-climatic patterns have also helped in its reconstruction from the Quaternary to Holocene period. The palaeo-climatic studies were basically carried out in the saline lakes of Didwana, Lunkarnasar and Sambhar in Rajasthan by Singh *et al.*; while Enzel *et al.*, worked on the Lunkarnasar dry salt lake; Krishnamurty *et al.*, carried out studies on the lake deposits in Rajasthan and Shinde *et al.*, on the Sambhar Lake. The results from all these studies have been summarised by Shinde as shown in the chart. The other areas where palaeo-climatic investigations were carried out are Sonmiani Bay near Balakot, Pakistan (1983) [**conclusion: “occupation during both cultural periods existed under essentially modern climatic conditions”**]; oxbow lake near Malwan (1973) [**conclusion: “pollen sequence suggests little environmental change”**]; Nal Lake near Ahmedabad (1978) [**conclusion: “lake level stability between 3000 and 1500 BC”**]; wood charcoal from Mehrgah (1985) [**conclusion: “little, or nothing to suggest higher rainfall in the past”**]; from the seed samples from Rojdi excavation (1991) [**conclusion: “environment during the third and early second millennia was significantly different from today”**]; Bannu Basin (1986) [**conclusion: “several lines of evidence point to the existence of moister conditions within the basin 3000 to 5000 years ago”**], Pakistan and in an oxbow lake in Pratapgarh district of Uttar Pradesh (1975) [**conclusion: “the general vegetational pattern is rather uniform”**]. The studies by Carriee Morrill *et al* (2003) based on the available research from 36 previous ones have concluded that there were three major climatic changes in the past corresponding to c. 9500 BCE, 3000-2500 BCE and 1300 BCE. The recent climatic studies from the lake Kotla Dahar in

Haryana (Petrie *et al* 2014) indicate two prominent shifts in the rainfall distribution and pattern during the mid-Holocene corresponding to c. 4400-3760 BCE and c. 2200-2000 BCE respectively. The second change corresponds to the terminal phase of the Harappan civilization and also tallies with shift in monsoonal data of around 300+100 years from Oman (Petrie *et al* 2014).

All the above studies are not unanimous as the reconstruction of past climatic and environmental conditions and its relationship with rainfall condition is rather a complex one. Further, Petrie *et al* (2014) also concludes that the climatic data from the late Kotla Dahar may not be extendable to other regions of the Harappan civilization due to the ambiguity of the climatic and the cultural changes. Thus, it may be observed that a section of scholars advocates a wetter environment during the third millennium BCE when the Harappan Civilization flourished, while others indicate there was no marked difference in the climate and environment during the third millennium BCE from today's one. However, based on the above studies, it may be observed that at least for around 300-400 years during the peak of Harappan culture, there was a favourable environment with good monsoonal cycles, which could have transformed and modified towards the end of the culture, coinciding with a time bracket of around 2100-1900 years. This climatic change also coincided with the transformation of Harappan culture, which ultimately deurbanised around 1900 BCE.

2.B.vi Formative Phase of Harappan Civilization

The urban phase of the Harappan culture (2600 – 1900 BCE) is the resultant of a long drawn cultural processes and transformation is now clearly understood from the investigation of sites belonging to the formative phase from different regions of the Harappan domain. In particular, the evidence from the site of Mehrgarh on the River Bolan and the nearby sites of Nausharo, Pirak and Sibri presents a long sequence of over 7000 years. The earliest phase at Mehrgarh also corresponds to the climatic changes that occurred worldwide towards the onset of Holocene period around 12000-10000 years ago. The evidence also indicates the movement of bands of people in accordance with the climatic cycles in search of pasture and game for hunting. Thus, the evidence in the Balochistan and piedmont areas indicate the movement of bands towards the plains from the upland Balochistan during harsh winters. The site of Mehrgarh is located on one such piedmont area along the River Bolan and the excavations by J.F. Jarrige from 1976 onwards clearly indicate the transformation of a hunter gatherer community mainly dependent on wild cereals and animals to a sedentary community domesticating cereals like wheat and barley and animals like sheep, goat and cattle.

The sedentary and settled life of the people at Mehrgarh facilitated by the domestication of crops and animals soon enabled the establishment of earliest villages. The surplus in food production due to the sustained cultivation of crops could have enabled the support for craft production as witnessed by evidence of long distance trade of shells (*Turbinella pyrum* from Gulf of Kachchh and *Pinctada* sp. from Oman peninsular region), turquoise from Central Asia, lapis lazuli, agate-carnelian. The invention of copper smelting following a long Neolithic



phase of around 2000-2500 years during the 6th millennium BCE is the next major landmark, which also coincided with the invention of complex technologies using pyrotechnical mechanisms. The pyrotechnological mechanisms enabled the production of copper, high quality ceramics, transformation of steatite, a soft stone into a much harder one and several craft activities. The craft activities like stone bead manufacturing, terracotta figurines, tools and utensils, which originated at Mehrgarh and other contemporary sites, ultimately formed the foundation of later regional Chalcolithic cultures and the Harappan culture. The domestication of sheep, goats and the Indian zebu (*Bos indicus*), the latter actually happened in South Asia, formed the staple diet along with the cereals at Mehrgarh is also another contributing factor for the advancement of cultures.

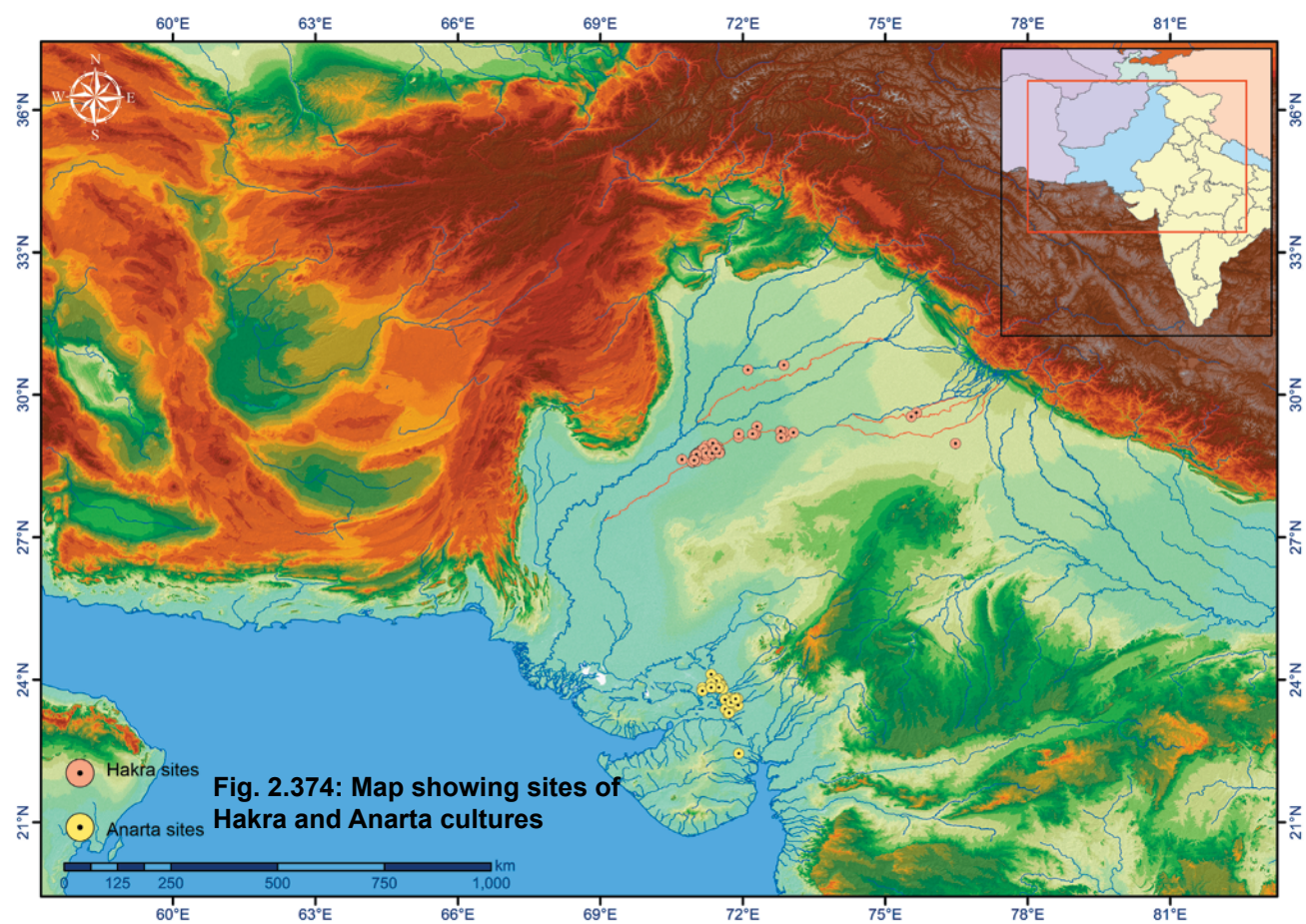
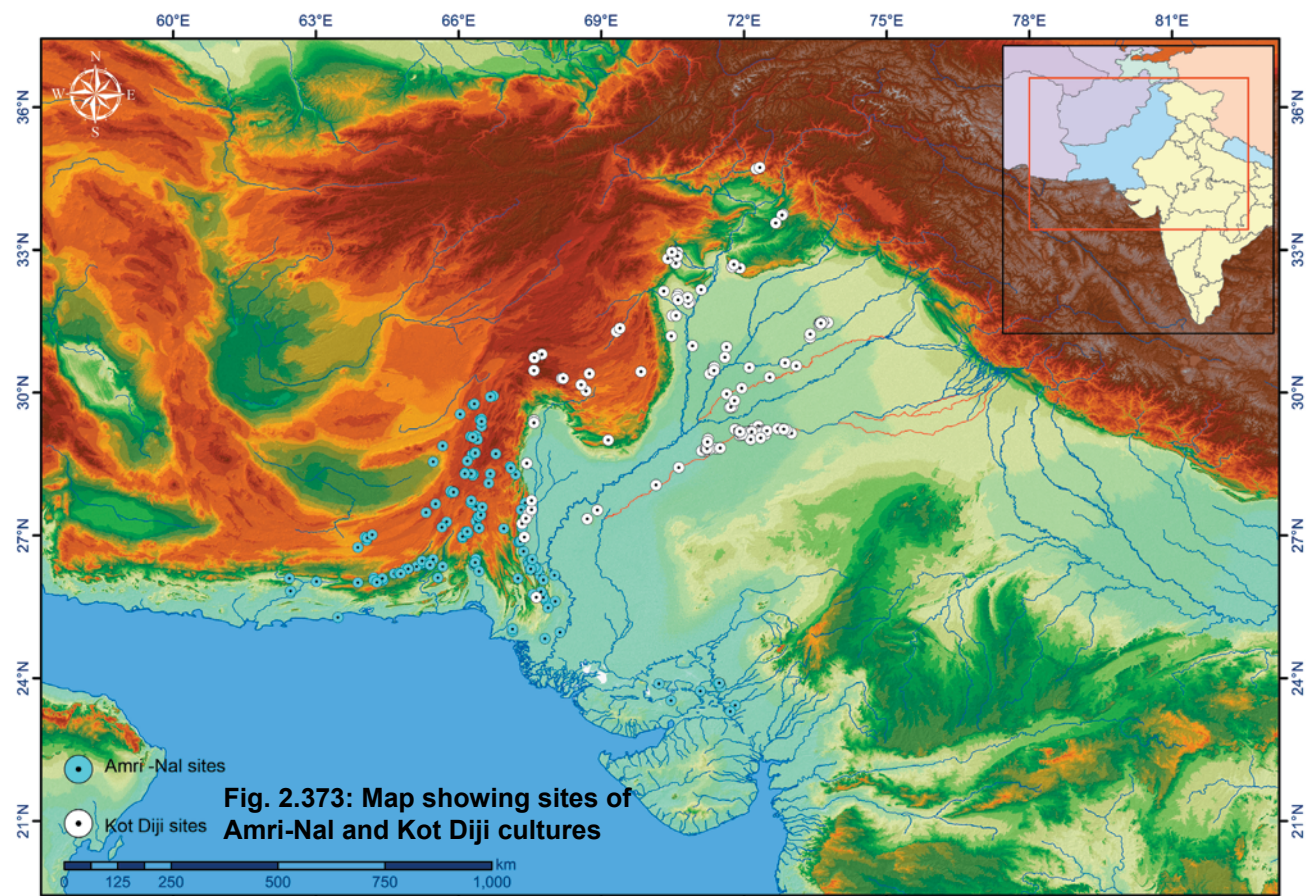
The subsequent chalcolithic phase at Mehrgarh around 6th millennium BCE saw an explosion in population and also adoption of strategies suitable for catering to the growing population. The strategies included invention of new technologies like copper smelting, production of highly advanced ceramics with prolific decoration, complex technologies that could have catered the elite groups that could have controlled the exotic raw material acquisition, their distribution and trade. This is also the phase during which regional cultures emerge all over the Greater Indus region represented by distinct cultural elements, chiefly defined by the ceramics. Thus, the generally accepted regional chalcolithic cultures called phases that originated around 5th – 4th millennium BCE onwards are represented by the type sites / regions like Amri-Nal, Hakra (Cholistan), Kot Diji, Sothi-Siswal and Anarta (Gujarat). These regional cultures come under the category of Early Harappan culture.

2.B.vi.a Amri-Nal Phase

One of the prominent regional chalcolithic cultures and later corresponding to the early Harappan phase is represented by the type-sites of Nal / Sohr Damb in Balochistan and Amri in Sindh. The site of Nal is located in the Khozdar area, linking the northern and southern Balochistan. The site covers an area of 5 ha in size. The site was excavated in 1925 by H. Hargreaves and later by the German Research Society and Government of Pakistan starting from 1997 to 2005. The typical Nal pottery is from Period II and datable from c. 3100-2700 BCE, which defines the Nal phase consists of buff ware with polychrome painted motifs with different shapes that include ovoid, narrow mouthed pots, carinated pots with narrow mouth, straight walled jars, open and carinated bowls, canisters. The painted motifs consist of both geometric and natural ones including fish and ibex in various colours like black, turquoise, red, yellow. The site also brought to light good evidence of burial practices.

The site of Amri is located in the Sindh region of Pakistan and on the right bank of River Indus. The earliest period at Amri corresponds to the early Harappan phase, which is sub-divided into four sub-phases. N.G. Majumdar, who first identified the Amri-Nal diagnostic culture there, excavated the site in 1929 and 1930 and later Jean-Marie Casal subjected it to excavation from 1959 – 1962. Possehl (1999) considers the evidence represented by both Nal and Amri assemblages,





in the Sindh, Balochistan area and treats them as a singular complex. The Amri ware consists of fine wares generally fire light red or buff, along with red and buff slips with painted designs in black colour (Possehl 1999). The painted motifs are mostly geometric in nature, which transforms into curvilinear patterns towards the end of this early Harappan phase. The Amri-Nal assemblage is better represented at sites like Balakot near Sonmiani Bay west of Karachi, Ghazi Shah, Amri and Mehrgarh. The spread of Amri-Nal culture into Gujarat is also noticed during this period and a few modest settlements with fortifications were noticed.

2.B.vi.b Kot Diji Phase

The Kot Dijian cultures is found in a larger region than that of Amri-Nal and they coexisted in a few sites in the Balochistan region. However, the ceramics of both these cultures are distinct in nature so that they could be easily identifiable. The absence of tall jars and short jars with featureless rims of the Amri-Nal assemblage and the fat-bodied pots and canisters of Nal assemblage from the Kot Dijian ceramic assemblage makes it distinct from other cultures.

The Kot Dijian ceramic assemblage is characterised by the various forms, shapes, and surface treatments, and found in red or buff fabric. The Kot Diji ceramic is also finished with a fine and smoothed surface. One of the prominent motifs is the 'horned deity' on the pottery vessels, which continues well into the Harappan period also, depicted on seals and ceramics as well. An interesting aspect is the

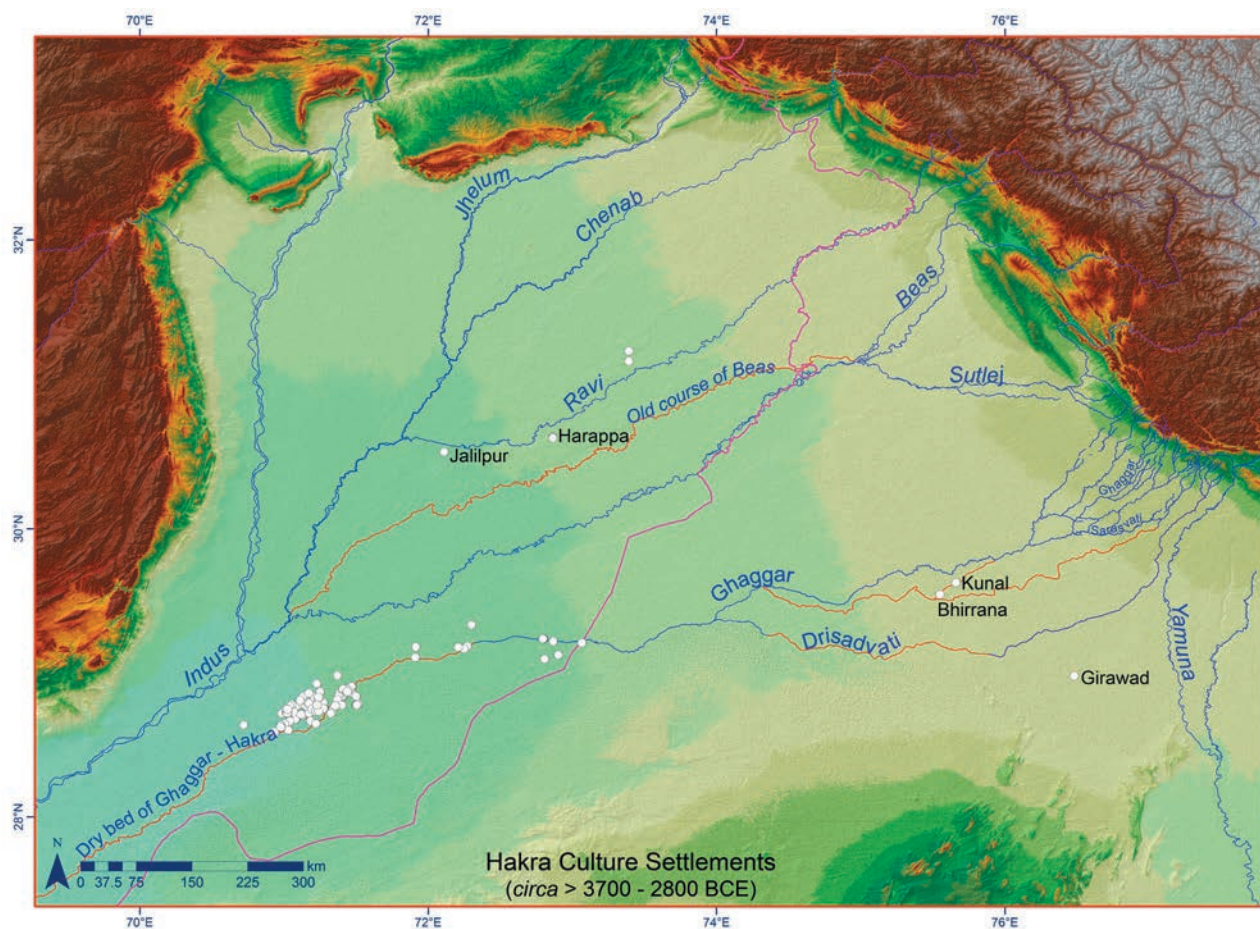


Fig. 2.375: Map showing sites of Hakra cultures

horned deity motif on a Kot Dijian pot is found from the Neolithic period from Burzahom in Kashmir, indicating long distance trade contacts. Other distinct ceramic types of Kot Diji are 'Bhoot Ware', 'Wet Ware', 'Sand Rusticated Ware'. The Bhoot ware was first noticed at a site known as Bhoot in Cholistan region, distinct with the deep grooves on the surface of small globular pots, indicating its use as water containers. The wet ware is distinguished by the crinkled surface pattern, often with dendritic pattern. The sand rusticated ware is similar to the ceramics of the Amri-Nal, Damb Sadaat and Sothi-Siswal (Fabric B of Kalibangan) assemblage and identifiable with the application of a thick slip of sandy clay applied over the body portion of the ceramics. Harappa is the largest Kot Dijian site along with the other larger sites like Lathwala (30.5 ha) and Gamanwala (27.3 ha). The other important sites are Rehman Dheri, Sarai Khola, Lewan, Dabar Kot.

The Kot Dijian culture was first identified from the site of Kot Diji, which is located at the southern edge of Rohri Hills and on a traditional trade route on the eastern side of River Indus. M.R. Mughal (1988) revisited the stratigraphy of the excavations and identified a large-scale conflagration all over the site separating the early and mature Harappan levels. Mughal (1988) defines the 'early Harappan' based on the findings from this site taking into account the continuity of cultural material during the mature Harappan period. The Kot Dijian phase is generally datable to the first half of the third millennium BCE.

2.B.vi.c Anarta Phase

The ceramic assemblage found mostly from the sites located in northern Gujarat and pre-dating the mature Harappan phase is termed as Anarta ware. The Anarta ceramic assemblage is characterised by Gritty Red Ware and accompanied by Fine Red Ware, Burnished Red Ware and Burnished Grey/Black Ware. The Anarta type of ceramics has been found from the sites of Surkotada, Padri (some typological similarities), Somnath (pre-Prabhas ceramics), Santhli, Loteshwar. On the other hand, the excavator R.S. Bisht has identified the ceramics from the early periods of Dholavira having similarities to the Period II of Amri. The ceramics from Stage I and II of Dholavira consist of wheel made red to pink wares, comb incised wares and a reserved slip ware. Possehl (1999) also notices that the ceramics from the earliest levels of Dholavira corresponds to the transitional phase of Amri (Period II). Further, the ceramics of Stages I and II at Dholavira, which correspond to the early Harappan phase also have presence of Anarta characteristics. The ceramic traditions of Amri into a few sites in Kachchh as well as Dholavira indicate the influence of cultural traditions of Sindh region. In addition to this, the regional Anarta traditions at Dholavira also indicate the cross-cultural interactions even during the early third millennium BCE.

2.B.vi.d Hakra Phase

The Hakra Culture marks the occupation of the Ghaggar-Hakra basins with the largest concentration in the Cholistan region of Pakistan. A total of 103 sites belonging to this culture have been discovered so far with a total settled area of 655.65 ha (Possehl 1999). Mughal (1982), who carried out an extensive survey



in the Cholistan area characterizes the settlements as “...low mounds in lesser Cholistan (Bahawalnagar and Bahawalpur Districts) and are located to close to, or in, the idahars (mud flats). In greater Cholistan (Rahimyar Khan District), they also occur on sand dunes.” The Hara culture settlements are datable to mid-fourth millennium BCE based on radiocarbon dates and stratigraphic correlations from other sites. This culture is identified based on a distinct ceramic complex, which among others consisted of “mud applique” and “Hakra incised” wares (Mughal 1982).

A majority (54 in number) of the 103 reported sites has been identified as camp-sites used by pastoralists, which has been attributed to the role of pastoralists during the early formative phases of Harappan Civilization. Among the Hakra culture sites, only two, i.e. Jalilpur and Harappa have been excavated and the latter yielded a stratigraphic occurrence of this culture below the early Harappan ones which is also dated from 3700-2800 BCE (Kenoyer 2013). The nature of human occupation from Harappa consisted of several working floors along with hearths (Kenoyer 2000), while at Jalilpur evidence of mud brick and earthen floors were encountered (Possehl 1999). The ceramic assemblage of Hakra phase consists of “...both wheelmade and handmade red wares with a variety of surface treatments” (Mughal 1982).

This consists of ceramics, “...treated on the external surface with a secondary coating of mud mixed with bits of pottery called ‘mud applique’, ...series of incised lines on the external surface called Hakra incised” (Mughal 1982). The resemblance of some ceramic types of Hakra ware with Amri IA (Mughal 1982) and also from Mehrgarh, Kili Ghul Mohammad (Possehl 1999) has also been noticed indicating the cultural roots and interactions with other cultural assemblages. Another important ceramic type of Hakra ware is a red ware with black slip all over the body (Mughal 1982). A small percentage of handmade buff wares with black coloured paintings is also noticed that have parallels with Pakistan-Iran borderlands (Mughal 1982). The artefact assemblage from this culture consists of animal figurines of bulls and cows; bangles of shell and terracotta; grinding stone fragments; copper bits and pieces; stone tools like blades, borers, arrowheads, scrapers, cores.

The integration of the regional chalcolithic cultures into Harappan culture around c. 2600 BCE saw the introduction of several standardised features that continued up to around 1900 BCE. These include standardisation of bricks across the entire Harappan culture, planned cities and towns, pottery, seals and sealings, chert implements, decorated carnelian beads, technologies that defined several typical Harappan artefacts, copper and bronze vessels, shared motifs like pipal leaf, horned headdress, etc., weights and measures, belief in afterlife defined by certain burial practices to name a few. Further, several of the features of the early Harappan cultures also continued into the Harappan culture along with the standardised new elements. In addition to above, a distinct evidence for long distance trade with Mesopotamia and Oman also emerged during the Harappan culture, along with the findings of Harappan artefacts from various sites in modern Oman, Iraq, Syria, Iran and Central Asia.



2.B.vii Settlement Pattern of Harappan Culture

The archaeological investigations spanning for nearly a century has brought to light around 1500 settlements of the Harappan culture, mostly spread on the Indus and its tributaries, Sarasvati, Gujarat and Makran region of Balochistan. A few settlements in the Badakshan region of Afghanistan close to the lapis lazuli raw material source are also found, the prominent one being Shortughai. All these settlements share the characteristic features of the Harappan culture and hence a shared ideology and location to tap the raw material sources, procurement and redistribution.

These settlements consist of various sizes starting from small hamlets (< 1 to 1 ha), villages (1 – 5 ha), small towns (5 – 10 ha), larger towns and smaller cities (10 – 50 ha) and larger cities (> 50 ha) (after Kenoyer 1998). Scholars have identified at least five large cities with the possibility of a sixth one. They are Mohenjo-daro and Lakhanjo-daro (> 250 ha), Harappa (> 150 ha), Rakhigarhi (> 100 ha), Ganweriwala (> 80 ha) and Dholavira (>70 ha). These cities are situated at prominent and strategic locations of the Harappan civilization as though catering to control a large hinterland of roughly 170,000 sq. km. consisting of raw material resources and craft specialities. Each of the larger cities were supported by smaller towns, villages and hamlets, and surrounded by vast agricultural tracts that provided a constant supply of food resources.

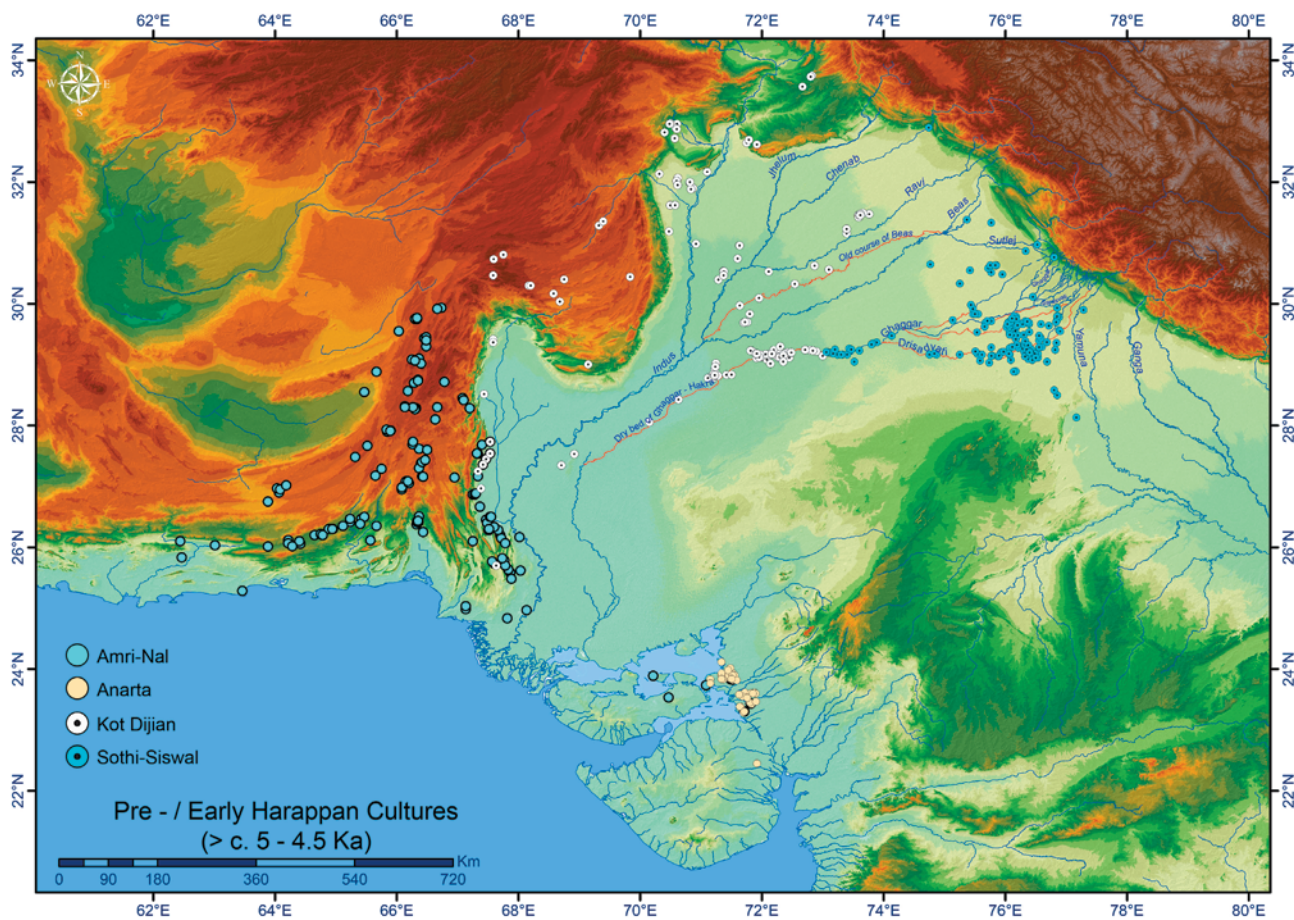


Fig. 2.376: Map showing sites of Kot Diji and Sothi-Siswal cultures



As per rough estimates, the extent of the Harappan civilization is now assessed at around one million sq. km. The western most Harappan site is Sutkaden-dor on the Makran coast, located on the Pakistan – Iran border, while the northern most site is Shortughai in Afghanistan. If Shortughai is taken as a part of isolated

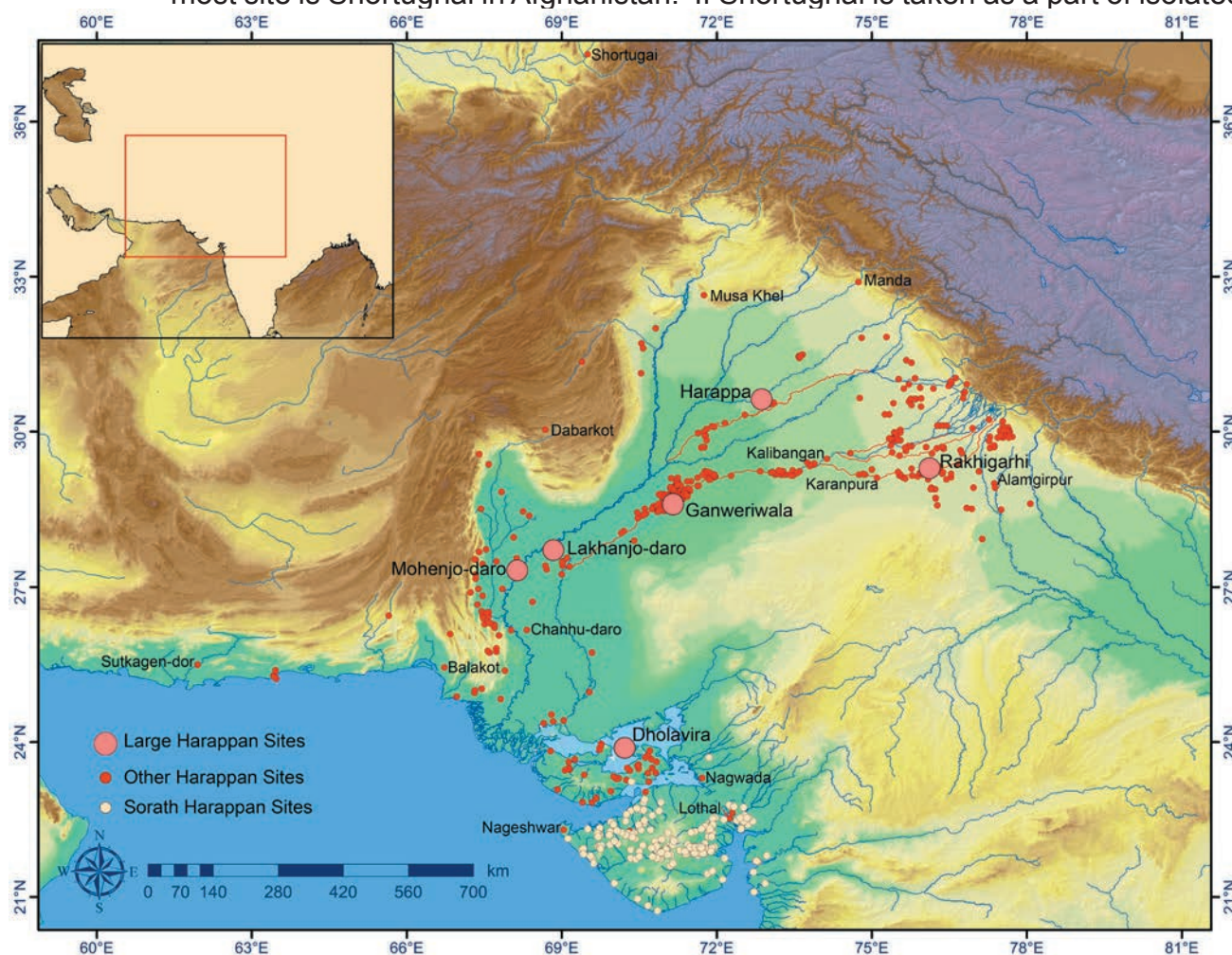


Fig. 2.377: Map showing sites Harappan civilization

cluster of sites, then Manda in Jammu & Kashmir is the northern most site. Several assessments have been made regarding the distribution of Harappan sites in Gujarat.

A majority of the scholars assess the entire Gujarat and even parts of Maharashtra to be under the Harappan domain, with the southern most site being Daimabad in Ahmednagar district of Maharashtra. However, fresh studies indicate that the sites located in the mainland of Saurashtra peninsula except the northern coast along the Gulf of Kachchh do not share the characteristic features of the Harappan culture, even though they are contemporary. These sites have been now termed under the category of Sorath Harappan after the type-site of Rojdi. The Harappan influence up the southern Gujarat along the eastern periphery of Saurashtra is, however, clearly understood and the site of Lothal is an exemplary example in this regard. The Harappan influence on the eastern domain is somehow less in comparison to the core area and Gujarat. The sites of Alamgirpur, Hulas in Uttar Pradesh are the examples of such sites, which have few elements

of Harappan culture and were contemporary in time bracket.

2.B.viii Planning and Layout

One of the hallmarks of the Harappan civilization is the town planning and layout of cities, clearly distinguishable into two or more divisions, each surrounded by a fortification, often referred with other terminologies like perimeter wall, circumvallation, and so on. The excavations at Mohenjo-daro (Marshall 1931) and later at sites like Kalibangan (Lal *et al* 2003; Thapar 1975), Lothal (Rao 1979) clearly

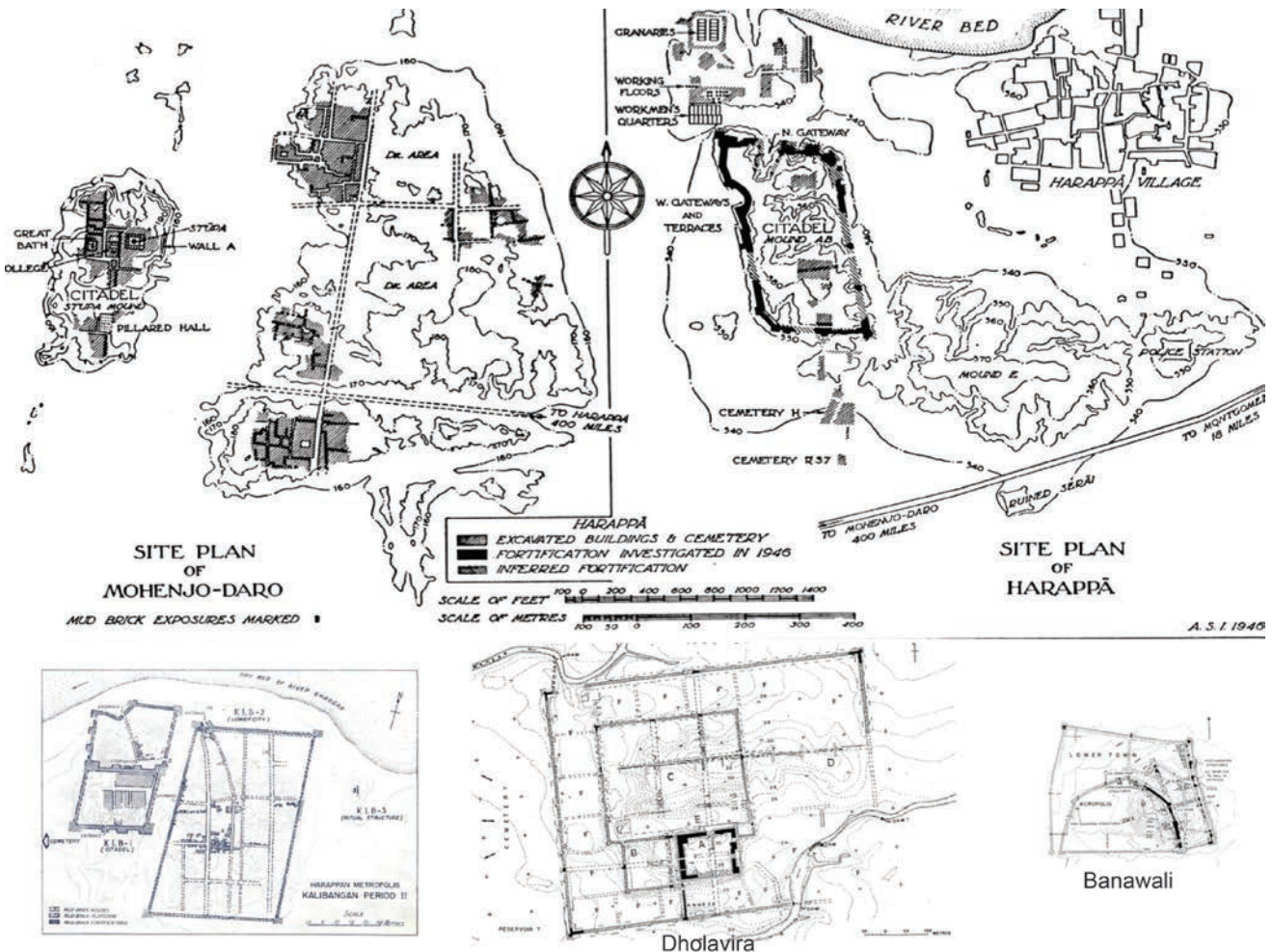


Fig. 2.378: Comparative plans of Mohenjo-daro, Harappa, Kalibangan, Dholavira and Banawali

brought to light the examples of city and town layout, with the orientation tilted towards a few degrees to the west or east of true North.

The interior layout of the cities also indicated proper planning and execution as witnessed from the gridiron pattern of arrangement of house blocks with the streets often cutting at right angles. The fortification walls were predominantly constructed using sun dried mud bricks in a majority of the cities and towns. The exceptions in this regard being the cities of Harappa and Mohenjo-daro, wherein baked bricks were used extensively. Even in these cities, mud bricks were used in an extensive manner during the early Harappan period and only during the mature Harappan period, the predominant use of baked bricks are noticed. The



cities and towns located in the Makran coast and Kachchh region of Gujarat had different options. They were using the locally available stone blocks in a major way. However, at Dholavira (Bisht 1990), mud bricks were used for construction of the core of fortification, while both the faces were veneered with stone blocks. The city layout of Dholavira also differs from other cities. Here, the entire city is circumvallated by a general fortification within which three individual divisions are again surrounded by individual fortifications, while a fourth one, Lower Town is within the overall outer fortification. The location and layout of the site of Dholavira on the island of Khadir and between two seasonal streams is a unique concept and totally different from other sites. In this regard, the city layout of Banawali is also different from the other sites. At Banawali, the upper town or Citadel follows a horseshoe shaped layout within an outer fortification, which also houses the lower town. Thus, it may be observed that even though the Harappans followed the general concept of city planning and layout, they indeed situated their cities and town as per the local requirements and landscape.

The Harappans used various building materials for their constructions. They consist of baked and unbaked bricks, stones (both dressed and undressed), etc. The most prominent aspect is the ratio of 1:2:4 maintained in the manufacture of bricks, both baked and unbaked ones. The various brick sizes noticed are 7 X 14 X 28 cm; 8 X 16 X 32 cm; 10 X 20 X 40 cm. The ratio of bricks noticed during the Harappans is also different from that of early Harappan period, which was 1:2:3. Scholars attribute various factors for the uniformity in the pattern of ratio followed for manufacture of the bricks. While the larger sized bricks were used for fortifi-



Fig. 2.379: Standardisation of bricks, Karanpura, district Hanumangarh, Rajasthan

cations, the smaller sized ones were for building houses. Kenoyer (1998) also notices the decrease in size of bricks from earliest to the end of Harappan phase at Mound E in Harappa. It has also been noticed that multi-coloured bricks were used in the construction of most of the fortifications of Harappan sites, which has been attributed as community participation towards the construction of a larger structure for the benefit of the entire community. Further, as the different groups within a settlement were participating in the supply of bricks, the colour varied according to the clay source, however maintaining the same ratio throughout as warranted by the planners. The origin of the standardisation of bricks in the Harappan context is still enigmatic, even though the traces of such a standardisation can be traced back to the Kot Dijian levels of the same ratio of 1:2:4 from the sites of Harappa and Kot Diji, while the eastern sites like Kalibangan, Banawali and others had a ratio of 1:2:3. Kenoyer (1998) observes that once the benefits of a fixed ratio was understood by the community, the benefits were passed on to other settlements and could have ultimately gained popularity in the entire civilization.

2.B.ix Material culture

2.B.ix.a Ceramics

The Harappan Civilization is characterised by a remarkable sophistication in the production of pottery consisting of red coloured surface often painted with various motifs and designs. The painted pottery of the Harappan Civilization constituted <10% while the remaining ones were unpainted and used for most mundane and day to day use. The painted ceramics was an important craft activity and the entire lengths and breadths of this civilization is marked by the presence of this kind of pottery. The sites like Harappa, Mohenjo-daro, Kalibangan, Lothal, Dholavira, Banawali, Rakhigarhi have brought to light excellent specimen of painted pottery. The pottery was manufactured in a variety of techniques, that involved both wheel turned and partly wheel turned and finished by hand. It has been observed through ethnographic parallels that large storage jars were partly wheel made and finished by hand due to its massive size, which prevented to completely model it on a wheel. Some of the pottery specimen like slender jars and large goblets were manufactured using a coiling technique. The coils of fine clay were prepared and placed one above the other, creating a rough form and shape and then the exterior surface smoothened and finished on a wheel using burnishing tools like leather, smooth pebbles, and also long chert blades. Often, the exterior surface was finished smoothly, while the interior of the pottery preserved the remains of coiling of clay placed one above the other.

While the pottery is in leather hard condition, burnishing and polishing of the surface takes place and then application of a chosen shade of red ochre (iron oxide), a naturally occurring mineral is applied which is readily absorbed by the pottery surface. This forms the base of the pottery, over which a different ochre shade (mixture of dark red-brown iron oxide and black manganese) is used to create the black coloured designs consisting of intricate patterns of loops, hatches, criss-cross patterns, intersecting circles, fish-scale patterns, natural and faunal





Fig. 2.380: Updraft kiln of Harappan period, Khirsara, district Kachchh, Gujarat



Fig. 2.381: Harappan pottery (Source NHK Catalogue)

representations of the contemporary environment. The slip applied over the pottery during leather hard condition or slightly dried condition turns bright orangish red, the typical characteristic colour of Indus Civilization pottery, upon heating in a kiln. The black coloured decorations applied over this slip fuses well into the base slip of the pottery and creates a distinct pattern.

Several distinct pottery shapes were manufactured based on the need, for utilitarian as well as decorative purposes. The broad shapes of pottery from Indus



Fig. 2.382: Harappan pottery (Source NHK Catalogue)



Fig. 2.383: Harappan pottery (Source NHK Catalogue)





Fig. 2.384: Black slipped jar from Harappa (left) and Dholavira (right)

Civilization are bowls, dishes, plates, storage jars, 'S' shaped jars, perforated jars, dishes-on-stand, cooking pots, beakers, goblets, miniature vessels and others.

The elaborately painted pottery of Harappan civilization indicates also the economic status of the owner of the ceramics as it takes longer time to manufacture. The plain and undecorated pottery is easier to manufacture and also requires lesser time when compared to painted pottery. Thus, the ceramics can also be used to understand the socio-economic factors of a particular household, and extended to a set of households, can reflect the status of a society. The study of pottery forms from various Harappan sites through time and space also indicates an internal evolution, even though the basic forms and shapes continue. Thus, it has been observed from the terminal phase of Harappa culture at Harappa, goblets obtain a distinct form, called as 'pointed base goblets'. Therefore, these ceramic types can be also used to even date a phase in the overall Harappa culture.

The ceramics also found their way as burial offerings in the Harappan burials. Often, the number of pottery forms and elaboration in decorative motifs indicated the status of the individual buried. The burial pottery consisted of both elaborately painted ones as well as unpainted. The pottery shapes from the burials also tallied largely with those from the habitation areas from within the city / town limits. Apart from the distinct black-on-red variety of ceramics produced by the Harappans, the other important pottery assemblage of this period consist of reserved slip ware (predominantly in Gujarat sites), black slipped jars, the larger

ones reaching up to 1.5 m in height, with a distinct black slip all over the body (mostly for transporting goods), black and red ware (in Gujarat), perforated jars (most probably used as strainers and used in association with a bigger vessel).

The Harappans also mastered the pyrotechnology to a greater extent to control the fire to certain degrees of requirement to create specific coloured patterns and glaze on the pottery surface. The most common type of kiln found in the Indus Valley sites is the updraft variety, the most elaborate and well preserved one has been recently found at Khirsara (Gujarat). The updraft kiln of the Harappan period consist of a circular pit, one end emanating in the form of a huge channel to add fuel into the underground chamber, which is topped by a platform consisting of a series of fire vents, that heated the pottery assemblage stacked over it. The circular pit is properly lined with either brick or stone as per the local availability, and after stacking the required quantity of pottery over the platform, it is sealed with a semi-circular domical structure with provisions of vents for escape of unwanted heat air. Once charged with fuel in the form of wooden logs through the tunnel on one end of the pit, the heat generated gradually reaches the semi-circular chamber through the vents provided on the platform. The vents on the platform were partly covered by broken potsherds so that the heat does not directly reach the pottery, which could have damaged and broken them due to excessive heat. The vent provided at the top or sides of the semi-circular dome is used to remove the excessive heat and also to monitor the temperature reached inside the chamber. The temperature can be gauged by the colour of the fumes coming out of this vent. The initial fume coming out of these vents will be smoky, then turns into red, orange, bright orange and once the temperature reaches well above 700 – 8000 C, the colour becomes bluish and transparent.

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Apart from the distinct black-on-red variety of ceramics produced by the Harappans, the other important pottery assemblage of this period consist of reserved slip ware (predominantly in Gujarat sites), black slipped jars, the larger ones reaching up to 1.5 m in height, with a distinct black slip all over the body (mostly for transporting goods), black and red ware (in Gujarat), perforated jars (most probably used as strainers and used in association with a bigger vessel).

The Harappans also mastered the pyrotechnology to a greater extent to control the fire to certain degrees of requirement to create specific coloured patterns and glaze on the pottery surface. The most common type of kiln found in the Indus Valley sites is the updraft variety, the most elaborate and well preserved one has been recently found at Khirsara (Gujarat). The updraft kiln of the Harappan period consist of a circular pit, one end emanating in the form of a huge channel to add fuel into the underground chamber, which is topped by a platform



consisting of a series of fire vents, that heated the pottery assemblage stacked over it. The circular pit is properly lined with either brick or stone as per the local availability, and after stacking the required quantity of pottery over the platform, it is sealed with a semi-circular domical structure with provisions of vents for escape of unwanted heat air. Once charged with fuel in the form of wooden logs through the tunnel on one end of the pit, the heat generated gradually reaches the semi-circular chamber through the vents provided on the platform. The vents on the platform were partly covered by broken potsherds so that the heat does not directly reach the pottery, which could have damaged and broken them due to excessive heat. The vent provided at the top or sides of the semi-circular dome is used to remove the excessive heat and also to monitor the temperature reached inside the chamber. The temperature can be gauged by the colour of the fumes coming out of this vent. The initial fume coming out of these vents will be smoky, then turns into red, orange, bright orange and once the temperature reaches well above 700 – 8000 C, the colour becomes bluish and transparent.

2.B.ix.b Sculptures and architectural members

The art of producing stone sculptures and architectural members is another advancement of Indus Civilization. Even though a few specimen of stone sculptures have been discovered so far, they fully attest the style and craftsmanship of the Harappans. Most of the stone sculptures are broken ones showing a seated cross-legged person with one leg drawn upwards. The material for making these sculptures is limestone, sandstone, 'greystone'. A red sandstone torso from Harappa is an exceptional example of the Harappan craftsmanship and distinct from other sculptures which are mostly in a seated posture. The sculpture from Harappa is a broken one with head and arms missing. The sockets for fixing the arms also are visible near the shoulder. Another sculpture from Harappa is that of a 'dancer', depicted with a raised left leg, while the arms are missing.

The seated male sculptures are mostly broken and found from Mohenjo-daro, while a headless sandstone sculpture is reported from Dholavira. These sculptures have a similar posture and adorned with a cloak over the left shoulder except the one at Dholavira which is not clear in execution. One sculpture of a seated male of limestone from Mohenjo-daro (height 33.5 cm) is near complete except corrosion due to weathering. This sculpture is adorned with shell inlay in one eye.

The face is depicted with shaved upper lip and combed beard. Another head of a sandstone sculpture from Mohenjo-daro (height 13.5 cm), is badly weathered and broken, is depicted with a combed hair and head band. A limestone headless sculpture from Mohenjo-daro (height 28 cm) has details of the seated male figure, with the left leg drawn upwards and right leg folded, and the respective arms resting on each leg. The details of the braided hair lock and ribbon is also well preserved indicating the nature of hairdo during the Indus civilization of prominent individuals. The sandstone sculpture from Dholavira is a seated one with a flat base, with arms resting on the knees on drawn up legs, which are kept apart to show the genitals. The rear of this sculpture depicts falling hair lots. The



sculpture has no features indicating clothing. The sculpture also shows evidence of damage and vandalism.

The finest example of craftsmanship is that of 'Priest King' sculpture from Mohenjo-daro. This steatite sculpture (height 17.5 cm) found partly broken below the arms however indicates a seated posture and comparable with the headless seated sculpture from the same site. The lower portion of this sculpture is broken, but nevertheless preserves the probable posture of the person, which is very similar to other examples. The evidence of drapery worn on the left shoulder and covers most part of upper body except the right shoulder is most elaborately decorated with trefoil decorative patterns. Inside these trefoil patterns are sunken spaces and evidence of nail impressions, clearly indicating adornment of inlays within them. These inlaid pieces were carved and painted with red pigment as interpreted by Kenoyer.

The hair is groomed well, held together by a fillet covering the forehead with a central circular inlaid ornament. The findings of gold fillets from Harappan sites like Mohenjo-daro, Allahdino closely resembles this decorative pattern. The dis-



Fig. 2.385: "Priest King" (Source NHK Catalogue)





Fig. 2.386: Seated image (Source NHK Catalogue)



Fig. 2.387: Seated image (Source NHK Catalogue)



Fig. 2.388: Animal sculpture (Source NHK Catalogue)



Fig. 2.389: Animal sculpture (Source NHK Catalogue)

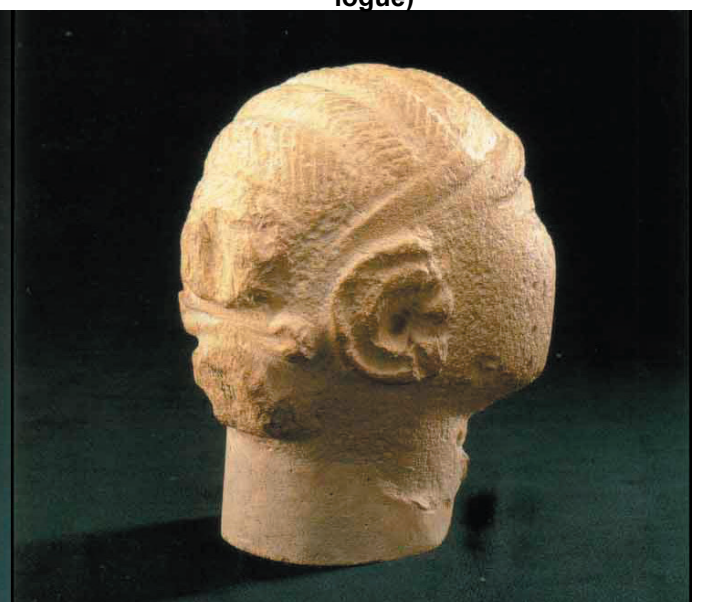
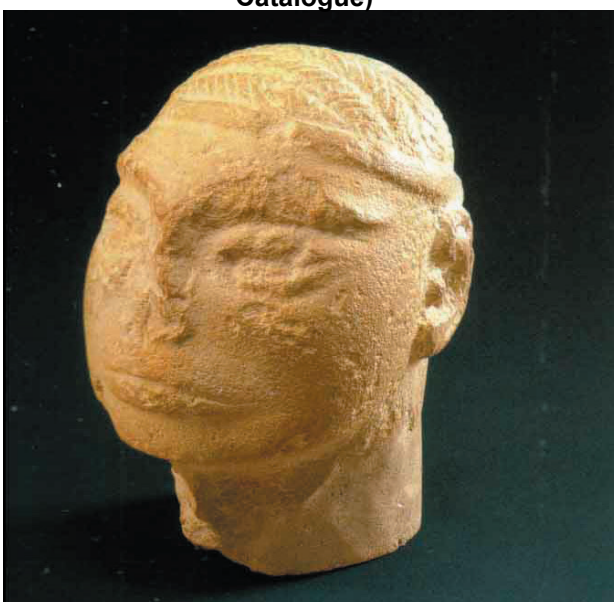


Fig. 2.390: Stone heads (Source NHK Catalogue)



Fig. 2.391: Stone pillar elements (Source NHK Catalogue)

covery of a circular gold object with steatite inlaid at the centre tallies well with the central decorative piece worn on the forehead of this sculpture. The eyes are depicted narrow and could have been inlaid, while the upper lip is shaven and beard groomed nicely. The rear portion of head is finished flat and the presence of one deep groove below each ear has been interpreted by Kenoyer to hold an elaborate horn and plumed head-dress.

The best examples of stone workmanship is also found in the form of finely finished and polished architectural members, mostly from the sites of Harappa, Mohenjo-daro and Dholavira. Dholavira, has been particularly exceptional in terms of a variety of findings and also yielding evidence of a limestone quarry along with unfinished architectural members.

These architectural members at Dholavira have been found *in situ* at the north and east gates of Castle and also in secondary locations and used in a later period contexts. Three broad types of architectural members have been discovered so far, viz., (i) basal slabs, square on plan to hold other members on its top, (ii) circular members with concave profile, often resting on basal square slabs and (iii) truncated spherical members. The second and third variety of members have a circular hole on its top and bottom to hold wooden dowels to prevent horizontal movements.

Another variety of pillar elements is also found at Harappa, with a wavy pattern on top and bottom. The discovery of three such elements from near a local shrine at Harappa have diminishing sizes, so that they rest one above other with clear interlocking of wavy patterns. Another interesting feature of the stone members from Dholavira is the discovery of a quarry site and unfinished stone members at a distance of 3 km north-northwest of habitation site. The scientific studies carried out on the raw materials from Dholavira and finished products from Harappan and Mohenjo-daro reveals that Dholavira was the production centre for these pillar elements (particularly of truncated spherical ones) and transported to far off cities.



2.B.ix.c Terracotta figurines

Figurines modelled out of clay are found in large numbers from Indus civilization sites. These figurines fall into two broad categories, viz., human and animal representations. The human figurines are represented by both male and female ones, and in some of the female figurines, suckling child is also depicted. The distribution of human figurines indicate that they are found mostly in the large cities of Indus valley like Harappa and Mohenjo-daro and in Balochistan area, while it is rarely found in the eastern and southern domains of Indus civilization. The site of



Fig. 2.392: Human figurines of terracotta (Source NHK Catalogue)



Fig. 2.393: Human figurines of terracotta (Source NHK Catalogue)



Fig. 2.394: Animal figurines of terracotta (Source NHK Catalogue)

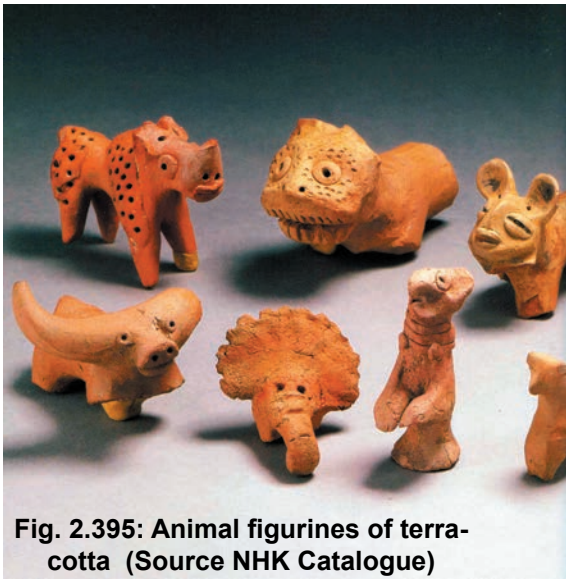


Fig. 2.395: Animal figurines of terracotta (Source NHK Catalogue)

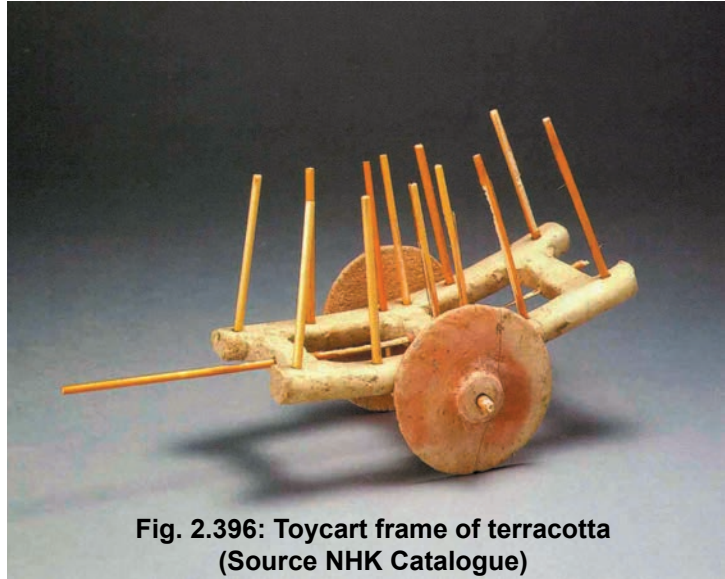


Fig. 2.396: Toy cart frame of terracotta (Source NHK Catalogue)



Fig. 2.397: Toy cart frame (Source NHK Catalogue)

tility.

The female figurines from the Indus valley sites are elaborately decorated and shown with elaborate head-dress, multiple necklaces adorned with amulets, and multi-banded waist bands. The elaborate decoration of female figurines in contrast with the male figurines can be seen from the examples. These female figurines are also identified by some scholars as mother-goddess symbols and could have been used as a ritualistic symbol. Kenoyer interprets that these figurines were manufactured by potters and purchased by individuals for conducting rituals and later discarded to be used by children as toys. As these terracotta figurines are made of burnt clay, they tend to break after a certain degree of use and hence broken and then finally discarded.

Dholavira has also brought to light a considerable number of human figurines even though other sites in this region are devoid of such figurines. Dholavira has yielded eighteen such figurines, most of them broken and different in style and design from the Indus valley sites. This variation has been interpreted by scholars due to regional differences in beliefs. Scholars like Kenoyer interpret that the male and female figurines and some animals can be directly associated with the concept of fertility.



Apart from the human figurines, a number of animal figurines and terracotta toy carts, wheels are found from various Harappan sites. Bull figurines dominate the assemblage followed by examples of other domesticated varieties, also a very examples of terracotta unicorn. The terracotta toy carts, both hollow framed and solid framed ones help us in understanding the transport system of the Harappans. Similarly, the spoked painted patterns found on terracotta wheels found from sites like Rakhigarhi are indicators of spoked wheels used in carted carriage vehicles. Some of the animal figurines could have been used as ritual objects, but a majority of them were toys, while a few ones are also created to serve a dual purpose of playful objects as well as a whistle. Examples of puppetry can also been seen in a few cases, e.g. from Karanpura, in which the head was separately modelled and fixed on a groove, while it can be drawn up and down as a puppet with the help of a string.

2.B.ix.d Lapidary making

Beads occupy an important position in antiquity record. Along with beads, pendants and amulets were also in use for creating a combination of necklaces, sometimes with carious coloured stones and precious metals like gold. In the Indian sub-continent, beads of turquoise, steatite, shell, dentalium, calcite, lapis lazuli are noticed as early from the Neolithic levels of Mehrgarh (7th – 4th millennium BCE). The presence of turquoise beads from the Neolithic levels is a clear evidence of long distance contacts, as turquoise had to be procured from either Iran or Central Asia, nearly 1500 km from Mehrgarh. Similar is the case with other materials like lapis lazuli and shell, which have to be procured from sources that are located far away from Mehrgarh. The Chalcolithic levels at Mehrgarh show further sophistication, and new materials appear which include carnelian, calcite, garnet beads. Also found were used and unfinished drills of phthanite among the debitage of semi-precious stones like chalcedony, agate, carnelian and turquoise. However, Kenoyer suggests that the term phthanite should be discarded as it is not an officially recognised scientific term. The evidence from Mehrgarh indicates a diversity of materials used for making beads. Through the course of transition from Neolithic to the Indus levels, more and more harder stones were introduced, while the length of the beads also increased. The mineral used for one of the drills is also identified as pumpelleyite.

Among the other Neolithic and Chalcolithic sites where beads are noticed are Mahagara in the Belan valley which yielded terracotta beads from the Neolithic levels. The Chalcolithic levels of the numerous sites in the Indus plains saw a gradual increase in the quantity as well as diversification of raw materials for making beads. This culminated in the succeeding Harappan period with an explosion in the bead industry.

The Harappans were technologically much advanced in the raw material procurement, production and distribution of various kinds of beads. The Harappans exploited a wide variety of semi-precious stones for bead manufacturing. A recent study by Randall Law from Harappa indicates that, during mature Harappan phase, the Harappans exploited nearly 40 different kinds of rocks and minerals



from different geographic zones. It has also been identified that out of these, only 11 varieties were present in the preceding early Harappan and Hakra-Ravi phase of the Harappa Culture at Harappa. Gujarat, being close to the agate raw material sources has large number of sites, which have evidence for bead manufacturing. The example of a bead-manufacturing furnace from Lothal is a classic example in this regard. The modern bead manufacturing tradition at Khambhat, (Gujarat) is another example on the continuity in traditional techniques even though the present-day bead-makers have adopted modern technologies.

Dholavira in Kachchh district of Gujarat represents another excellent evidence of flourishing bead-manufacturing industry of various materials right from the earliest stage onwards. Further, the recording of at least three bead workshops at different localities of the city, one of Harappan phase and two of late Harappa phase indicates the continuity in such activities for a longer period. The presence



Fig. 2.398: Decorated carnelian beads (Source NHK Catalogue)



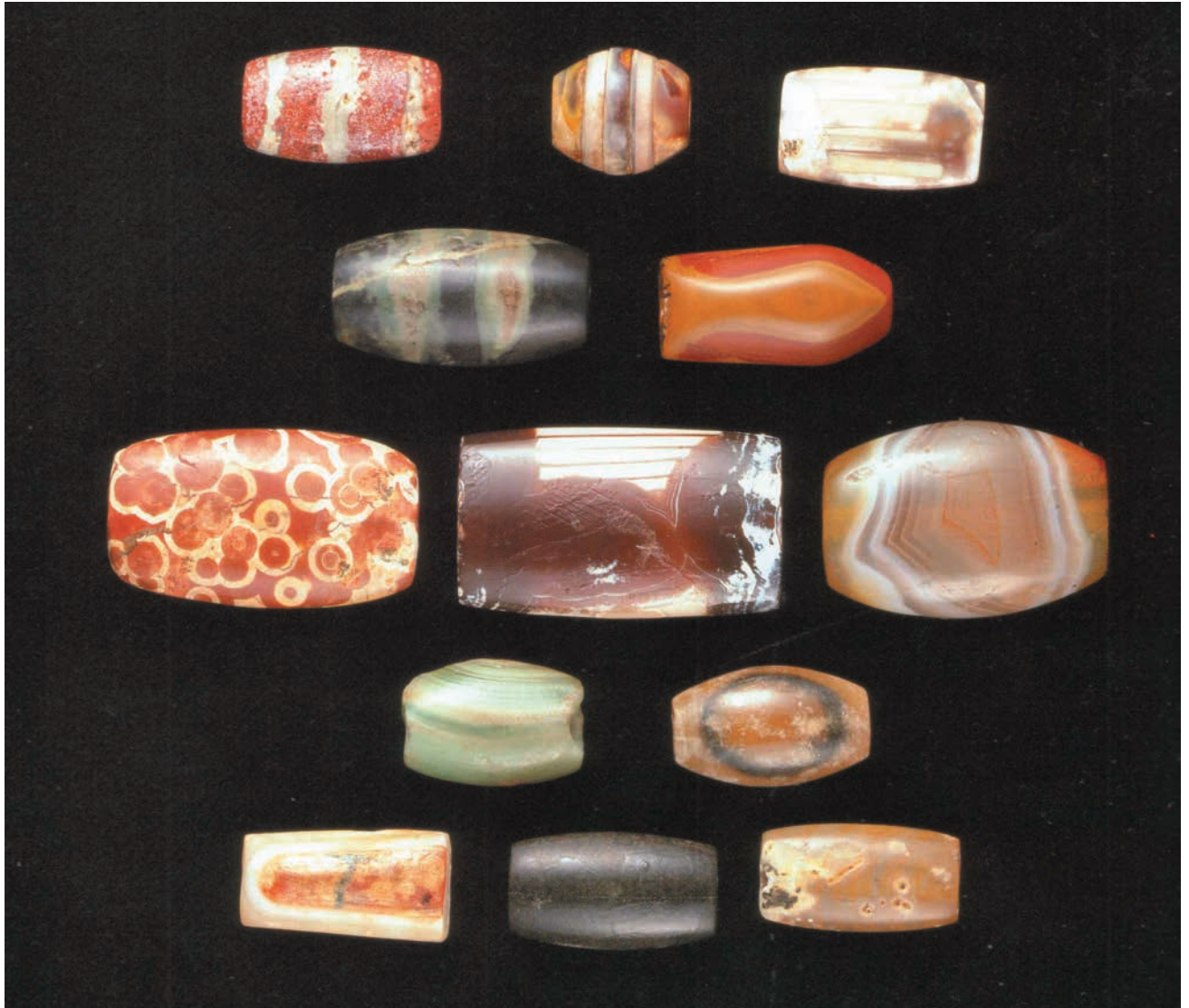


Fig. 2.399: Beads of different materials (Source NHK Catalogue)

of anvils, bead polishers, polished beads without perforation from the workshops indicates a flourishing bead trade at Dholavira. The various raw materials found the site along with chipped stone wastage (debitage) helps in understanding the manufacturing processes also. Harappans manufactured beads in a variety of shapes and sizes. They also preferred materials suitable for these shapes. For steatite was preferred for manufacturing disc and micro beads, the latter often less than 1 mm in diameter. Certain special category of beads like long barrel cylindrical and etched carnelian beads were important exports items from Harappan region to Mesopotamia. The long barrel cylindrical beads alternated with copper spacer and terminal beads were used in the production of waistbands for women, examples of such decoration can be seen on the Harappan terracotta female figurines. So far, only three such complete waistbands are known, one each from Harappa, Mohenjo-daro and Allahdino. The Allahdino example was found kept in a small pot inside a room, along with other jewellery of silver and gold. The etched carnelian beads are a kind of decorated beads wherein white coloured 'eye' and geometrical patterns were made with the help of alkali on red coloured agate-carnelian beads and heated. The alkali fuses into the matrix of the bead,



Fig. 2.400: Carnelian waist band and other jewellery (Source NHK Catalogue)



Fig. 2.401: Carnelian waist band and other jewellery (Source NHK Catalogue)





Fig. 2.402: Jewellery from Harappa (left) and Mohenjo-daro (right) (Source NHK Catalogue)

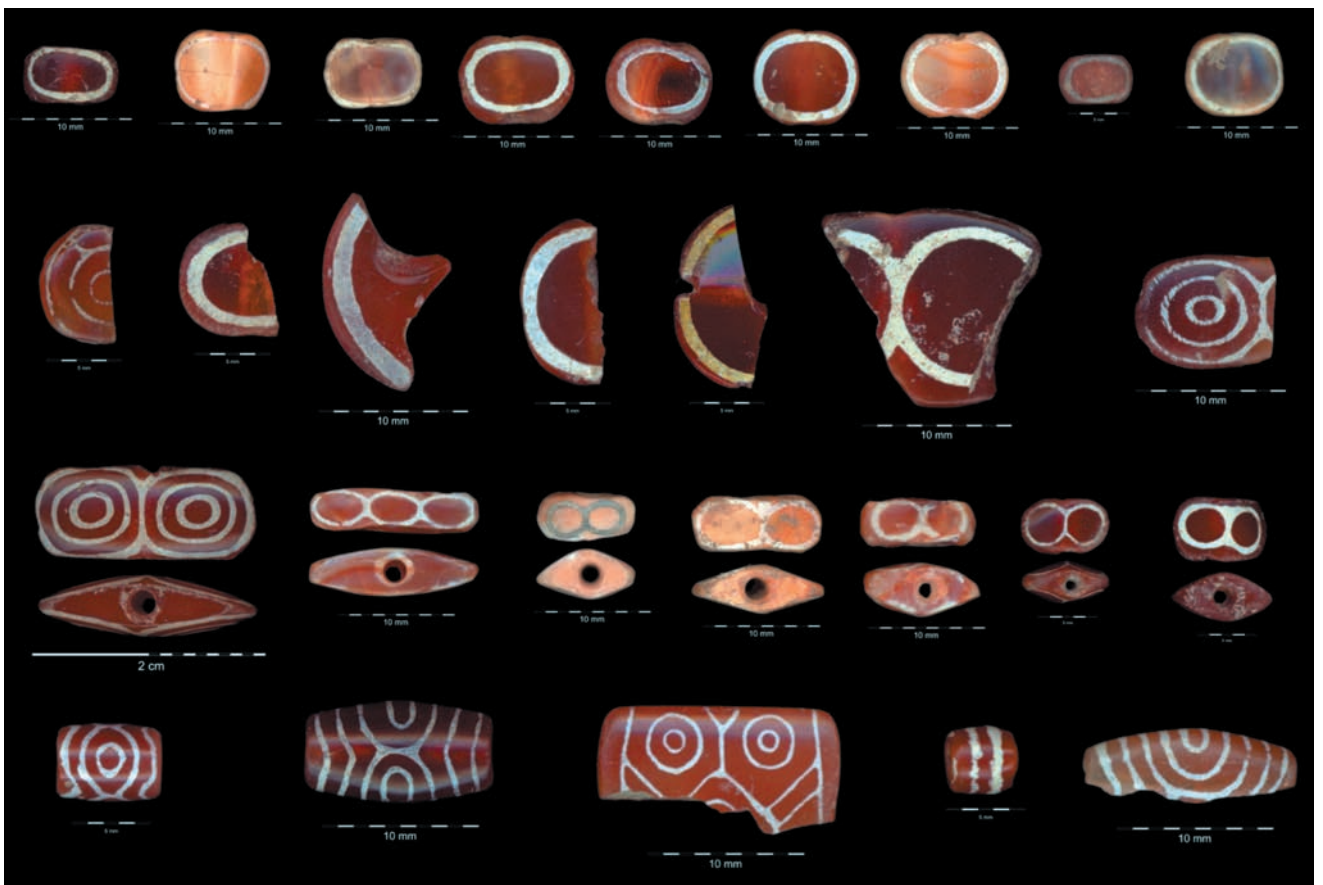


Fig. 2.403: Decorated carnelian beads from Dholavira

which creates a distinct pattern on the beads. Excellent examples in stages of manufacturing of long barrel cylindrical beads are found from Chanhudaro and special polishers for these beads are found from Dholavira. Examples of long barrel cylindrical and etched carnelian beads are found as far as upper reaches



Fig. 2.404: Bead workshop areas, Dholavira

of River Euphrates in Syria. The raw materials for the beads consist mainly of agate-carnelian, jasper, bloodstone, chalcedony, quartz, amazonite, claystone, lapis lazuli, sandstone, limestone, faience, steatite, paste, amethyst, vesuvianite, serpentine, turquoise, and others. The proximity of prominent raw material sources in Gujarat like those at Khandik, Mardak Bet, Ratanpura, enabled the Harappans to dominate in bead manufacturing. Raw materials like lapis lazuli came from very far off distances like Badakshan region of Afghanistan. Further, the presence of a special type of drill bits of a material known as 'erectite' also



Fig. 2.405: Stoneware bangles (Source NHK Catalogue)





Fig. 2.406: Bangles of shell, copper and faience (Source NHK Catalogue)

dominates during the Harappan period in Gujarat. Dholavira alone has recorded more than 1500 drill bits of ernestite, the largest so far recorded from any Harappan site. The drill bits of ernestite are slightly harder than agate-carnelian silicates and hence suitable to drill these harder materials and were a superior technology during third millennium BCE. This technology was later replaced by diamond tipped drills during first millennium BCE, which made the drilling process very easy and fast. The contemporary bead manufacturing industry at Khambhat, Gujarat has helped in understanding the chaîne opératoire processes. At Khambhat, one can see a long continuity of manufacturing in terms of some of the same techniques in sorting, chipping, several stages of heating to create the distinct reddish orange colour to agate-carnelian. The traditional drilling at Khambhat consists of double tipped diamond drills driven by a bow. A pot filled with water and provision for its dripping over the drilling surface enables the bead to remain cool and not to split due to extensive heat produced due to drilling. The polishing of the beads at Khambhat is at present carried out on a mechanised emery wheel.

2.B.ix.e Bangles

An important aspect of the Harappan artistic expression is bangles of various materials. Bangles of terracotta, shell, faience, copper, silver, gold, stoneware

have been found from different Harappan sites. The material used in manufacture of bangles help in also assessing the social status of the population. A large percentage of bangle collection was made of terracotta. The raw material for terracotta is clay, which is locally available and can be manufactured very easily. These terracotta bangles are often painted in white and black pigments, indicating preference to decorations on them. It is also interesting to know that Kalibangan, a prominent site on River Ghaggar in Rajasthan is known for thousands of black bangles found on the surface of ancient habitation. The name 'Kalibangan' is thus after the large number of bangle finds. The terracotta bangles are found in various sizes, thickness and diameters clearly indicating its need for different age groups. Invariably in most of the cases, the section of terracotta bangles is a circle. Examples of conjoined terracotta bangles and bangles with rectangular cross-section with grooves on the exterior are also found from Harappan sites. The bangles of shell, faience and stoneware are dealt under the respective sections.

2.B.ix.f Seals and sealings

Seals and sealings are administrative and bureaucratic records, which enable us to understand the transaction details during the Harappan civilization. The seals contain a script, so far undeciphered along with animal motifs. The origin of Harappan script is very complex and scholars have agreed that it is not related to any known script. The necessity for developing a script for recording the trade could have been felt by a group of merchants or guilds, which was later adopted throughout the Harappan civilization. The excavation at various sites indicates that graffiti marks on pottery could have been the precursors to Harappan script. Indication for this is obtained from the excavation at Harappa, which shows several graffiti signs appearing on potsherds of early Harappan phase become Harappan script later. The exact place of origin of Harappan script is also difficult to ascertain.

The Harappan script has been found on nearly 5000 objects of various materials like steatite, faience and metal seals; clay seal impressions, pots & potsherds, copper plates, incised shells, ivory cones and rods, stone and metal bangles, copper weapons, stones. The inscriptions are extremely short with an average count of five signs. The longest inscription found so far is of twenty-six signs. The computerized analysis of the signs, which are abstract in nature and hence called graphemes, has enabled to a general agreement among scholars for a total number of 400 – 450 graphemes.

Most of the graphemes are found on Harappan seals, which are good examples of craftsmanship in the execution of scripts as well as other motifs. A majority of the seals are square in shape and made from steatite. The excavation at Dholavira indicates that during early Harappan phase, only the motifs were carved on the seal. The seals were standardized during Harappan phase, during which an inscription occupies on the top of seal, an animal motif at the bottom occupying nearly two-thirds of the seal, with a manger in front of it.





Fig. 2.407: Seals from Mohenjo-daro (Source NHK Catalogue)



Fig. 2.408: Seals from Dholavira (Source NHK Catalogue)



Fig. 2.409: Seals from different sites (Source NHK Catalogue)

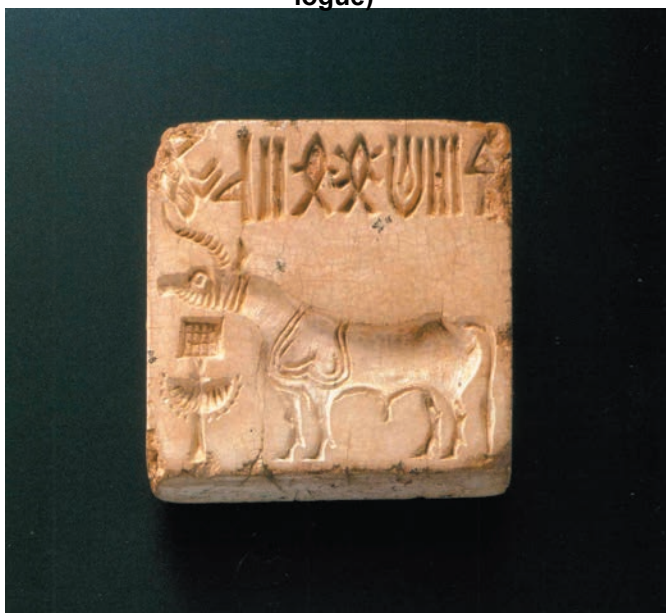


Fig. 2.410: Seal (Source NHK Catalogue)



Fig. 2.411: Seals from different sites (Source NHK Catalogue)



Fig. 2.412: Seals from different sites (Source NHK Catalogue)



Fig. 2.413: Seals from different sites (Source NHK Catalogue)

The late Harappan seals are rectangular in shape, with only the inscriptions, while the motifs disappear. Thus, a clear evolution of seals could be observed from Dholavira. The knob or boss with a perforation on the reverse of square seals has a bipartite division, while the rectangular ones have a plano-convex rear with a perforation. Scholars agree that the motifs and inscription are carved on soapstone, polished and fired at high temperatures to produce a glazed surface due to the addition of an alkali. Soapstone also becomes harder due to firing at high temperature. The inscription is carved on the top of the seals, a majority of them in a single line, written from right to light. Boustrophedon style of writing, in which the inscription is written from right to light in the first row, and left





Fig. 2.414: Sealings from different sites (Source NHK Catalogue)



Fig. 2.415: Seals with geometrical motifs (Source NHK Catalogue)



Fig. 2.416: Seals of late Harappan period (Source NHK Catalogue)

to right in second row, and so on is also noticed for a very few long inscriptions.

The animal motifs and inscriptions on the seals themselves are excellent pieces of art exhibiting a high sophistication of carving styles. Among the animals depicted, unicorn dominates with 65% of depiction. The other animals depicted on the seals are buffalo, elephant, and rhinoceros. The seals were used to mark the transactions on wet clay placed over sealed consignments. Often multiple seal

impressions are noticed on a single clay lump, thereby indicating hierarchical checking points.

Once the consignments reach the right place of destination, the clay lumps are broken and thrown away. They are found in excavations in limited quantity, as they were unbaked. Some sealings are baked by accident and hence preserved in a better condition. The finding of 93 sealings from the context of a warehouse is the largest finding so far at a single place from any Harappan site.

A special category of seals is also found from Harappan sites depicting narrative scenes, the exact meaning of them is difficult to ascertain. A seal from Mohenjo-daro depicts a seated deity in yogic position with erect phallus and wearing a headgear resembling buffalo horns. Animals like rhinoceros, water buffalo, tiger, and an elephant surround the deity with a one-line inscription on the top. Two antelopes are depicted below the pedestal. Some scholars identify the deity as “proto-Siva”, due to the similarity in iconographic depiction. In the absence of decipherment of Harappan script, the exact meaning attached to this seated deity is difficult to ascertain. Another seal from Mohenjo-daro depicts worship of a deity with horned headgear and standing on a pipal tree. A kneeled figure is shown worshipping this deity. An antelope stand behind the kneeled figure, and a row of seven figures is shown below. This seal is another example of certain religious traditions and practices of Harappan period. Several depictions of deity with horned headgear can be seen on seals, moulded tablets, and in one case on a terracotta cake from Kalibangan.

Examples of seal carving are also found from sites like Mohenjo-daro, Harappa and Dholavira. A blank steatite seal with only an outline of unicorn and another seal with two erased letters of an already complete seal gives clue of manufacture and reuse. An unfinished seal from Harappa shows carving of animal and manger, while a blank space above the animal was left uncarved for a future inscription. Such examples indicate the sequence of events in carving portions of the seal.

2.B.ix.g Shell objects

Shell working is another important craft activity of the Harappans. Evidence of shell working in the Indus valley can be found as early as 7th millennium BCE at Mehrgarh. Shell was worked increasingly at the coastal sites of Harappan civilization due to their proximity to raw material sources. Important evidences of such shell manufacturing have come from sites of Golo Dhoru (Bagasra) and Nagwada, both in Gujarat and located along the shores of Little Rann of Kachchh. The important shell varieties exploited by the Harappans are *Turbinella pyrum*, *Chicoreus ramosus*, *Lambis truncata sebae* and *Fasciolaria trapezium* of the gastropod variety. These shell varieties are larger in size and suitable for manufacturing ladles, complete bangles and a variety of inlay patterns, both of geometrical and non-geometrical patterns.

Kenoyer identifies specific varieties of items manufactured from *Turbinella pyrum* (bangles, inlay from body whorl and solid objects from central columella), Cho-





Fig. 2.417: Shell bangles (Source NHK Catalogue)

reus ramosus (ladles, bangles and spoons), *Lambis truncata sebae* (large flat inlay pieces) and *Fasciolaria trapezium* (inlay from thick body whorl). The shell species have specific coastal areas of distribution and hence a good indicator of trade. While *Turbinella pyrum* is found along the coast near Karachi and Gulf of Kachchh, *Chicoreus ramosus* is found along the Gulf of Kachchh. The coastal region of Oman also is source for varieties of shell like *Chicoreus ramosus*, *Fasciolaria trapezium* and *Fasciolaria trapezium*. The shell manufacturing followed a specific pattern of organisation as depicted from the sites of Bagasra and Nagwada. While at Bagasra thousands of complete shell bangles out of *Turbinella pyrum* have been found along with raw materials and discarded columella portion, the evidence from Nagwada shows manufacture of inlay pieces and smaller objects from columella portion. Thus, it can be observed that certain sites were only manufacturing bangles, others were specialised in producing smaller objects.

Kenoyer also demonstrated the sequence of events in which the complete *Turbinella pyrum* shell was sawn to produce complete circlets and then a chevron (>) design engraved. In the case of ladle manufacture from *Chicoreus ramosus*, the large spiky portions on the exterior portion were struck off followed by chipping



Fig. 2.418: Shell inlay of various patterns (Source NHK Catalogue)

off the spiral columella and grinding the remaining unwanted portions to create different sizes of ladles.

Examples of use of shell bangles are found from various human representations from Harappan civilization. The famous dancing girl figure from Mohenjo-daro depicts set of bangles on her left hand, which has parallels from female burial in Harappa as well as ethnographic parallels in modern Gujarat. The deity in “pro-to-Siva” seal is also shown wearing set of bangles on both hands. The columella of shell species was used for manufacturing a variety of inlay pieces, beads, discs, weights, geometrical and non-geometrical objects as mentioned above. Dholavira, which was another major shell industry in Gujarat, has a range of such





Fig. 2.419: Faience artefacts (Source NHK Catalogue)



Fig. 2.420: Faience beads from Sanauli

inlay pieces.

2.B.ix.h Faience objects

Faience is a refractory material and is also a precursor of glass of early historic period. Faience was extensively used by the Harappans for manufacturing various artefacts like beads both medium and tiny, bangles, tokens, figurines, vessels, and others. The earliest recorded faience object is from Harappan datable to 3300 BCE. As per Kenoyer, faience in Harappan civilization was manufactured in with a technique known as efflorescence, in which colour of glaze and interior core are of identical colour. Two different processes of efflorescence have been noticed in Harappan faience. In the first process, powdered quartz mixed with flux and colourant is used to produce a faience paste and in the second process, quartz powder is partly melted mixed with a colourant to produce a frit. This frit is then mixed with additional flux to produce faience paste.

The presence of quartz pebbles from Harappan sites like Harappa, Mitathal, and others indicates its use for manufacturing faience. In particular, at Mitathal in Haryana evidence of a series of faience furnace along with several faience artefacts helps in understanding the faience production. The analysis of Harappan faience indicate the presence of alumina, sodium and potassium, which has been interpreted by Kenoyer that they are derived due to the addition of adhesives, flux or colourants. Kenoyer also suggests the stages in manufacture of faience bangles. It consists of preparing a coil of faience paste and winding it over a tapered mandrel, joined together at the ends and left for drying. The partially dried bangle was then decorated with the desired designs like cross lines and chevron patterns and slowly heated to produce the efflorescence effect. The Harappan faience have a distinct blue or blue green. Other colours noticed among the faience beads are yellow and white. Apart from single coloured faience objects, the Harappans also produced a variety of bichrome and multi-coloured faience objects like beads, often reminding glass wound beads of later period. Faience



Fig. 2.421: Stoneware bangles from Dholavira

was also used to imitate the stone eye beads and etched carnelian beads. A combination of white and brown colours were used to produce the faience eye beads, while white and red colours for imitating the etched carnelian beads. At the late Harappan burial site of Sanauli in western Uttar Pradesh, several faience beads exhibit a development of complex multi-coloured technique similar to wound glass beads of later times.

2.B.ix.i Stoneware

Stoneware bangles are a distinct class of artefacts of Harappan civilization, which as per Vidale is highly siliceous, partially sintered, homogeneous ceramic body, usually free from inclusions or voids visible to naked eye, and characterised by very low porosity. The stoneware bangles comes in two varieties, viz., those with pinkish grey to black in colour resultant of reduced firing conditions and other with a range of reddish shades due to re-oxidation. Several examples of this highly sophisticated bangle type are known from urban centres like Harappa, Mohenjo-daro and Dholavira. Some of these bangles have micro inscriptions inscribed on them before firing, probably indicating ownership records. The surface mapping of Mohenjo-daro during the 1980s enabled to record a stoneware bangle workshop which brought to light a mechanism of double system of closed saggars. Studies by Halim and Vidale have enabled in a graphical reconstruction



of Coated Carinated Jar (CCJ) in a kiln, which consists of double containers, one within the other, the outer one resting on terracotta bangles for support. The exterior surface of the container was properly insulated from the high temperature conditions by applying chaff tempered coatings.

The unbaked stoneware bangles were placed inside the inner container and finally closed and a sealing impression of a unicorn seal is also made. The presence of sealing on the lid of container is a clear indication of controlled mechanism of manufacture of these highly sophisticated bangles. Scholars agree that the stoneware bangle technology emerged from the already existing terracotta bangle one. The technology of stoneware bangles was lost with the end of Harappan civilization and scholars working on experimental archaeology are yet to produce successful replication.

2.B.ix.j Metallurgy

The Harappans inherited their knowledge in collection of raw materials, smelting and production of various metals to their antecedent chalcolithic cultures. Harappans used a variety of metals, viz., copper, lead, silver, gold and electrum. Other metals found from Harappan context in trace elements are zinc, cinnabar. They also mastered the alloying technology and produced bronzes, mixing copper with arsenic and tin. They also gained expertise in exploiting the various raw material resources. The exact identification of raw material sources require scientific provenance studies. However, a survey of raw material sources indicates those from Afghanistan and Balochistan (southern Afghanistan Seistan, referred to as Gardan-i-Reg), Oman and Rajasthan (Khetri, Alwar, Ambaji mines). Scholars agree that the Harappans did not smelt copper and could have imported them in ingot form. The lack of slag heaps generally associated with smelting is not found from Harappan sites, but rather found near the ore sources like Khetri in Rajasthan and Oman. The ingots are of plano-convex shape and examples are reported from Lothal, Dholavira, Chanhudaro, Harappa, Mohenjod-daro. These ingots were broken into desired fragments and melted to produce various implements. The evidence of kilns with a heavily vitrified interior surface and a blackened surface is found from sites Harappa, Lothal and Mohenjo-daro.

Casting is a technology for modifying the ingots to secondary ingots or to produce finished products using moulds. Examples of cast made objects have been reported from sites like Chanhudaro (a covered cart with wheels missing and a complete cart with driver holding the goad), Harappa, Mohenjo-daro (dancing girl). Other technological and craft activities associated with metallurgy as defined by Kenoyer are fabrication (modification of non-molten metal), shaping (controlled mechanical stretching of metal), forging (controlled shaping of a metal by a hammer), spinning and turning (mechanical stretching using a lathe instead of hammer), drawing (in which copper or silver wire are produced), cutting (thin sheets of metal cut to produce desired shape with the aid of 'V' shaped chisels), joining (cold joining with the aid of rivet and hot by pouring another metal at the joint portion), finishing (filing, engraving, setting, and others; particularly noticeable in the case of silver and gold objects as copper is heavily corroded). Metals were used



Fig. 2.422: Copper artefacts (Source NHK Catalogue)



Fig. 2.423: Copper artefacts (Source NHK Catalogue)



Fig. 2.424: Copper utensil (right) (Source NHK Catalogue)



Fig. 2.425: Copper mirror (Source NHK Catalogue)



to produce a variety of objects of utilitarian purposes. Thus copper was used to produce seals, tablets, fish hooks, pins, antimony rods, mirrors, beads, bangles, rings, composite ornaments in association with gold, silver; and implements like spearheads, adzes, axes, hoes, arrowheads, chisels, knives, large blade tools; tools like copper drills, saws or scrapers and utensils like plates, vessels. Copper implements were also highly prized during Harappans and served probably as status symbols. Examples of large number of copper objects are found in hoards. One such example is a hoard from Harappa wherein a large cooking pot covered by a bronze plate contained numerous copper tools and weapons like straight edged axes, shouldered axes, blade axes, double axes, daggers, spearheads, chisels, saws, arrowheads, lancehead, bowl.

Silver objects like spiral rings, beads, bangles, composite ornaments are found. Gold was used to produce chiefly ornaments separately and also in association with copper, steatite and others. Gold fillets are also reported from Harappan sites like Allahdino (from a complete hoard of agate-carnelian waist band, silver and gold ornaments), Mohenjo-daro and Harappa. The fillets are thin strip of gold sheet which were worn on the forehead and tied at the back. Example of a similar filler in combination with an inlaid circular object can be seen on the 'Priest King' figure from Mohenjo-daro. Interestingly, similar circular objects of gold and copper inlaid with steatite are reported from sites like Harappa and Dholavira.

2.B.ix.k Textiles

Organic remains like textiles are uncommon from archaeological records and it is the same in case of Harappan civilization. Evidence of types of dress styles are evident from several terracotta figurines. The cloak worn by 'Priest King' is another example of embroidered garments worn by elite Harappans. Often impressions of textiles on clay objects are good evidence to investigate the weaving pattern technology of Harappans. One such example at Harappa was analysed by Kenoyer, who interprets the use of spinning wheels due to the uniform thickness of threads in a single piece of fabric and the tight weave. The presence of spindle whorls right from the early Harappan phase at sites like Harappa (Pakistan), Karanpura (Rajasthan) are good evidence of textile production. The other evidence for looms and textile production are grooved bricks and stones (used probably as loom weights). The presence of distinctive curved copper / bronze knives from Harappan sites has been interpreted by Kenoyer as indirect evidence of production of carpets.

Further, threads used to string metal beads and cloth used to wrap metal implements are preserved with the aid of metal salts. Evidence of such thread remains and impressions are found inside copper beads and implements from sites such as Mohenjo-daro, Harappa and Dholavira. The impression on copper implements termed as pseudomorphs also help in identification of weaving pattern as indicated by an example from Harappa. A copper bead necklace preserved remains of tussar silk thread which was identified with the aid of a Scanning Electron Microscope (SEM). Similarly, a copper bead from Dholavira preserved remains of a thread which has been tentatively identified as cotton / jute fabric.



2.B.ix.I Weights and Measures

Another important aspect related to commerce and trade during the Harappans is the usage of weights and measures. The cubical chert weights are conspicuous items from any Harappan site. A.S. Hemmy was one among the earliest scholars



Fig. 2.426: Chert cubical weights, triangular and truncated spherical weights, Dholavira

to have a detailed account of weights from Mohenjo-daro (1931) and Chanhudaro (1943). Later, M.S. Vats (1999) gives an account of the weights found from the excavations at Harappa. Hemmy (1931) identifies two series at both Harappa and Mohenjo-daro and also concludes that there is ‘....no local variation between the weights in the two places, although 500 mile apart.’ Hemmy (1931) also notes that the sequence of ratios is striking which runs as 1, 2, 4, 8, 16, 32, 64, 160, 200, 320, 640, 1600, and concludes the absence of sexagesimal system and all ‘...ratios are binary or decimal.’

Hemmy (1931) also observes the various possibilities of arriving at the weighing system based on the weight of grains such as wheat, barley, ratti. Hemmy (1931) finally concludes that the mean value of the most commonly occurring weight is of ratio 16 and weighs 13.71 gm at Mohenjo-daro. Hemmy (1943) later on the analysis of a large number of weights from Harappa, Mohenjo-daro calculates the ‘Mode’, or value of maximum frequency to be 13.625 gm. The weights are based on a binary system, which double as they increase in the ratio of 1:2:4:8:16:32, etc with the 16th ratio amounting to 13.63 gm, which is the basic reference system. Any weight found from the Harappan sites are a multiple or a fraction of 13.63 gm. The weights following the above ratio are found in vari-



ous materials like chert, chalcedony, ivory, shell, copper, terracotta, etc. Another weighing system along with the cubical ones is also found from the Harappan sites.

The shape of these weights is truncated spherical. The presence of difference weighing patterns from the same sites indicates that the Harappans might have adopted two or more weighing standards, for both inland as well as export tradings. It is also interesting to mention here that a Isin - Larsa period (ca. 1900 – 1800 BCE) text from Ur (modern Iraq) mentions that 13,100 mana of Dilmun (modern Bahrain) is equivalent to 611 gin 6 2/3 mana of Ur standard through which the equivalent of Dilmun mana can be calculated to 1,371.5 to 1,376.8 gm. This is equivalent to multiple of hundred in Harappan weighing systems. This clearly indicates the adoption of Harappan weighing system in distant lands to facilitate the trading mechanism.

2.B.ix.m Disposal of dead and Religion

The religious beliefs of the Harappans can be deduced from several depictions of narrative scenes from the seals. The depictions indicate a preference to nature worship by the Harappans. The pipal tree attained wide acceptance and depicted in various mediums indicating its prominence. The pipal tree is shown worshipped in a seal from Mohenjo-daro. Several narrative scenes on terracotta and seals also indicate presence of nature worship. Scholars like B.B. Lal have also put forth that the Harappans worshiped fire. Lal cite the evidence of fire altars from Kalibangan to indicate such a practice.

The Harappans practices various modes of disposal of dead. Evidence for cremation, post-cremation urns, burials of various kinds have been reported from several Harappan sites. The presence of post-cremation urns from sites like Mohenjo-daro, Chanhudaro, Harappa indicates that the bodies were cremated and burials erected by collecting the remains. Elaborate burials are also found from sites like Harappa, Kalibangan, Farmana, Rupnagar, Lothal, etc., indicating extended inhumations in a north – south orientation. The skeletons were interred either in a simple burial pit, or inside a mud-brick lined pit and in wooden coffins. Evidence of pot burials alongside the normal burial modes is also found from sites like Kalibangan. The burials are accompanied by elaborate burial goods in the form of pottery of various types. In addition, personal belongings like bangles, necklaces, beads, mirror, kohl jar, etc., were also found along with the burials indicating a belief in afterlife.

2.B.x Trade contacts with Mesopotamia

The contacts that Harappan had with Mesopotamia were ascertained as early as 1924 when Sir John Marshall announced the discovery of Indus Civilisation (Marshall 1924: 538). The publication of number of Harappan seals and other objects from Harappa and Mohenjo-daro paved way to the identification of similar finds from sites in Mesopotamia and Susa, thus establishing a link between these two great civilizations (Sayce 1924: 566; Gadd and Smith 1924: 614-616). Some of

the earliest finds that were compared with Harappan antiquities came from Kish and included a typical unicorn seal with Harappan signs, long barrel cylindrical beads of carnelian and etched carnelian beads (Mackay 1925: 697-699). These findings also helped in placing the hitherto unknown Indus Civilisation in a proper chronological horizon. The subsequent excavation at Chanhudaro by Mackay brought to light a large number of unfinished carnelian beads known to us as “long barrel cylindrical beads”. Mackay noticed (Mackay 1937: 2):

“.....Chanhudaro numbers of unfinished beads were unearthed, ... not only large numbers of incomplete beads but also the raw material from which they were made, and, still more interesting, the actual stone drills by which they were bored, Chanhudaro has proved to have been a great centre of bead-making....” (Mackay 1937: 2)

This was an important piece of discovery which proved beyond doubt that similar finds from Mesopotamia were actually manufactured in Indus valley and exported by the Harappans. Harappan Civilization is also identified with “Meluhha” of the cuneiform records of Mesopotamia. The mention of “Meluhha” is made for the first time in the cuneiform inscriptions of Early Dynastic Period of mid third millennium BCE (Possehl 1996:133-208)). There has been a reference by Sargon of Agade (2334-2279 BCE) that the ships of Meluhha, Magan and Dilmun were coming up to Akkad (Agade):

*“the ships from Meluhha,
the ships from Magan,
the ships from Dilmun,
He made tie-up alongside quay of Akkad.”*

The scholars identify Dilmun with the Island of Bahrain and the near shores of the Arabian Peninsula; Magan with Oman, and perhaps part of the Iranian coast around the Straits of Hormuz and Meluhha with Greater Indus region including the Harappan Civilization. Possehl has compiled (Possehl 1996: 133-208) the reference to Meluhha and items of trade, according which we come to know that there are 76 citations to Meluhha. Meluhha is mentioned in the inscriptions as a region located beyond Magan. The following is the list of citations to items of import from Meluhha during the Early Dynastic Period (ca. 2500 BCE) to Isin – Larsa Period (ca. 1900-1800 BCE):

Categories	References
Stone and pearls	Carnelian: 8 attetations Lapis Lazuli: 1 Pearls: 1
Woods and Plants	Gis-ab-ba-me-luh-ha: 12 Mesu wood: 7 Fresh dates: 1



Categories	References
Animals	A bird: 8, but 5 as figurines A dog of Meluhha: 1 A cat of Meluhha: 1
Metal	Copper: 2 Gold: 1
Meluhhan style objects	Ships of Meluhhan style: 2 Meluhhan style furniture: 3 Figurines of Meluhhan birds: 5

The external trade that the Harappans had with Mesopotamia has been dealt widely by scholars working in this area (Ratnagar 1981, Tosi 1982: 9-14, Rao 1979: 228-238, Possehl 1994: 185; 1996: 133-138; 1997: 87-90; 2002: 337). Ratnagar gives an object-wise analysis of the Harappan materials found in Indus valley vis-à-vis Mesopotamian region (Ratnagar 1981). The contacts Harappans established with the Mesopotamian world are further strengthened by the presence of Harappan pottery, seal, ornaments like ivory comb, etched carnelian beads, segmented silver beads, etc., from sites in Oman (Mery 1996: 171). The famous find is of course from Ras-al-Jinz in the Oman peninsula, where typical Harappan pottery was found along with a four letter Harappan graffiti on one black-slipped jar sherd (Tosi 1982: 2-4). The black-slipped jars are stated to be the most common Harappan pottery found in Oman which is clearly placed in the second half of third millennium BC. (Mery 1996: 170).

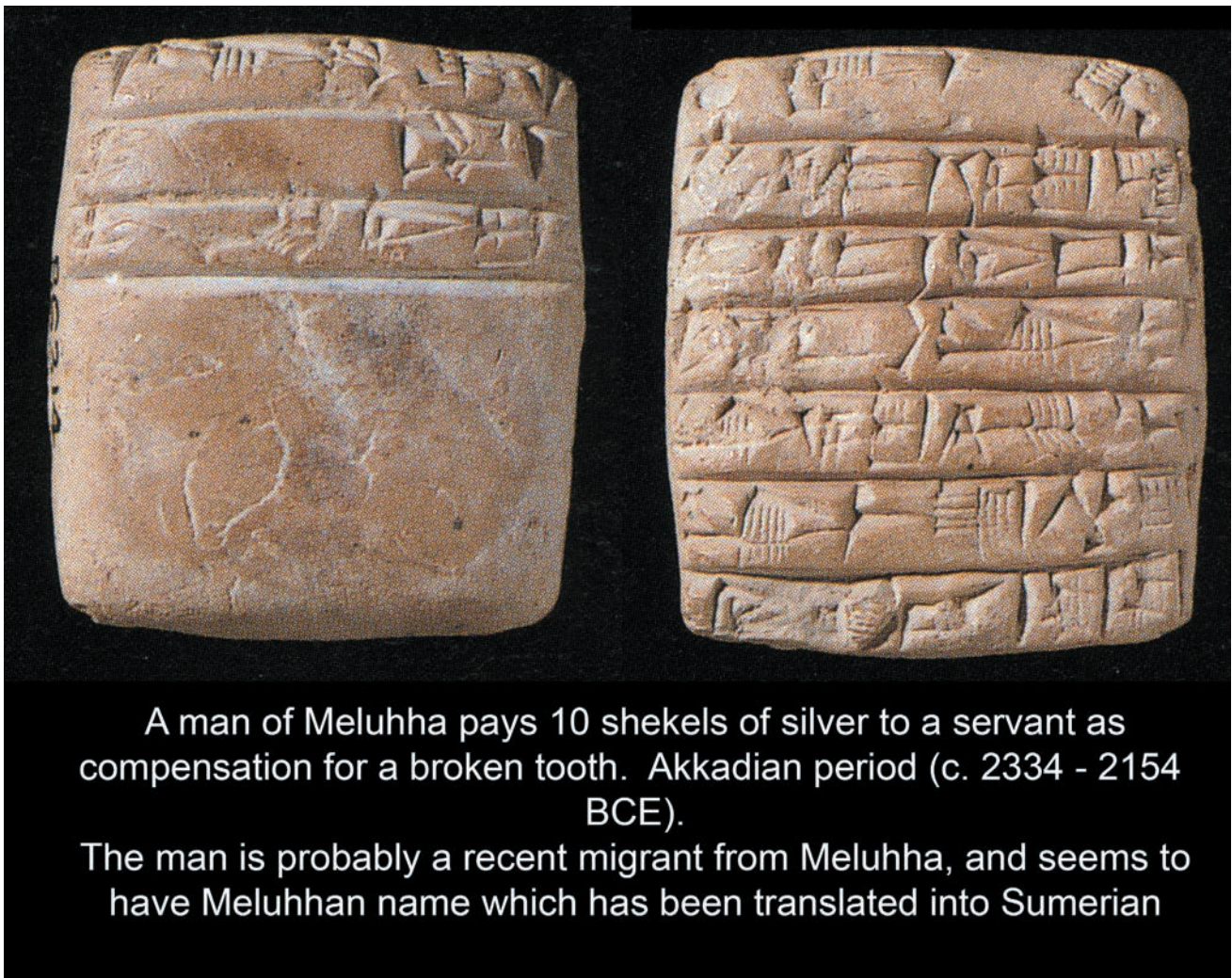
Among the items exported from the Indus Valley, the important ones are long barrel cylindrical beads and etched carnelian beads. The long barrel cylindrical beads are well defined as “long and slender, in excess of 5 cm, sometimes with a slight thickening at the centre” by Possehl (1996: 159). The long barrel cylindrical beads were manufactured in a variety of materials; the most beautiful is of carnelian and banded agate, the latter after heat treatment, attained the typical reddish colour of carnelian. The other materials in which these kinds of beads were made include that of jasper, terracotta, etc. Mackay states that from Mohenjo-daro, “some no less than 4.85” long and made of the finest translucent carnelian that it was possible to obtain” were found and it was a favourite item worn by the people of Harappa culture (Mackay 1937: 2). Initially, the long barrel cylindrical beads were reported from Harappa, Mohenjo-daro and Chanhudaro only based on the excavations from these sites. However, the subsequent researches and excavations conducted from a host of sites have also brought to light these kinds of beads in various materials from sites like Dholavira, Banawali (NHK 2000: 109), Kalibangan, Surkotada (NHK 2000: 109), Baror (personal communication), (all in India) and Allahdino (NHK 2000: 101) (in Pakistan).

The manufacturing techniques involved in the preparation of these kinds of beads were also discussed extensively by Mackay who also made a comparative study



of contemporary bead making from Baroach and Sindh (Mackay 1937: 3-4; 8). The long and slender drill bits from many sites like Dholavira suggest the drilling mechanism of the long barrel cylindrical beads (NHK 2000: 107).

Subsequent researches extensively documented the various stages involved in the procurement, sorting, heat treatment, chipping, polishing, drilling, and final treatment of similar beads from Cambay (Possehl 1981: 42-46; Kenoyer, Vidale and Bhan 1991: 49-55). The long barrel cylindrical beads are reported from sites like Ur (NHK 2000: 160), Kish from the Mesopotamia (Mackay 1925: 698; 1931; Possehl 1996: 160) and from Susa, Jalalabad, Marlik from Iran (Possehl 1996: 160). Possehl gives a complete list of references to Meluhha that is identified with Indus region which also includes eight citations directly mentioning carnelian from Meluhha (Possehl 1996: 139-144; 145). Out of these citations one clearly speaks of pure or bright Meluhhan carnelian (Gudea Cylinder B, Column 14.13: Possehl 1996: 140). This citation indicates that there should have been different grades of carnelian coming from Meluhha, and observing the different kinds of raw materials used for the manufacture of beads, the typical reddish orange with brilliant translucence could have been referred to as pure Meluhhan carnelian by the Mesopotamians.



A man of Meluhha pays 10 shekels of silver to a servant as compensation for a broken tooth. Akkadian period (c. 2334 - 2154 BCE).

The man is probably a recent migrant from Meluhha, and seems to have Meluhhan name which has been translated into Sumerian

Fig. 2.427: Terracotta tablet from Lagash (Source NHK Catalogue)





Inventory of deposits of barley that were available for distribution, including one in a granary in the village of Meluhha, located in the city-state of Lagash. Dated 2047 BCE

Fig. 2.428: Terracotta tablet from Lagash (Source NHK Catalogue)

The various studies conducted on the contemporary manufacture of beads also indicate that agate was heated to achieve the typical colour of carnelian during the production stages. This also indicates that there was a high demand for the reddish orange variety of carnelian with translucence and this demand is reflected in the production of such beads in the archaeological record of Harappan culture. Several such agate beads could be noticed with the typical colour of carnelian, thereby reflecting the efforts made by the Harappans to meet the market demand. This demand could be both internal as well as external. That the carnelian was in high demand is indicated by the number of citations so far discovered in the Mesopotamian record, carnelian stands only next to references to wooden materials coming from Meluhha. These citations do not mention the exact finished product and broadly speaks of carnelian only.

The long barrel cylindrical beads were also popular among the people of the Harappan culture. This is indicated by the presence of what could be seen as imitations in terracotta of these original beads, evidences coming from Harappa,

Mohenjo-daro, Banawali (NHK 2000: 109) and Surkotada, the one from the latter site is also of terracotta and also given a red slip to imitate the original beads (NHK 2000: 109). The beads from Banawali are also of terracotta but they could be termed as biconical or barrel shaped ones, even though it seems that they could have been imitations of long barrel cylindrical beads (NHK 2000: 109). The evidence from Harappa and Mohenjo-daro also indicate the manufacture of beads with this shape in faience. The popularity of the long barrel cylindrical beads also continued during the post-urban Harappan period.

This is clearly seen from similar beads from the late Harappan site of Sanauli which is being excavated (Sharma *et al* 2007: 166-179). Two beads, very much similar to the long barrel cylindrical beads, albeit with some minor variations, could be discerned in a burial from this site. These two beads seem to have formed part of a necklace as the evidence indicates, and it was found *in situ* around the neck of an individual. These two beads are also of the banded agate variety which is not available locally. This evidence also reminds us, the surviving of the internal trade network even during the post-urban Harappan times. Further investigations on these beads could enable us to pinpoint the exact source of the raw material so that the trade network theory during the late Harappan times may be substantiated further. The discovery of long barrel cylindrical beads from some of the sites in Mesopotamia and Iran attests their popularity in these

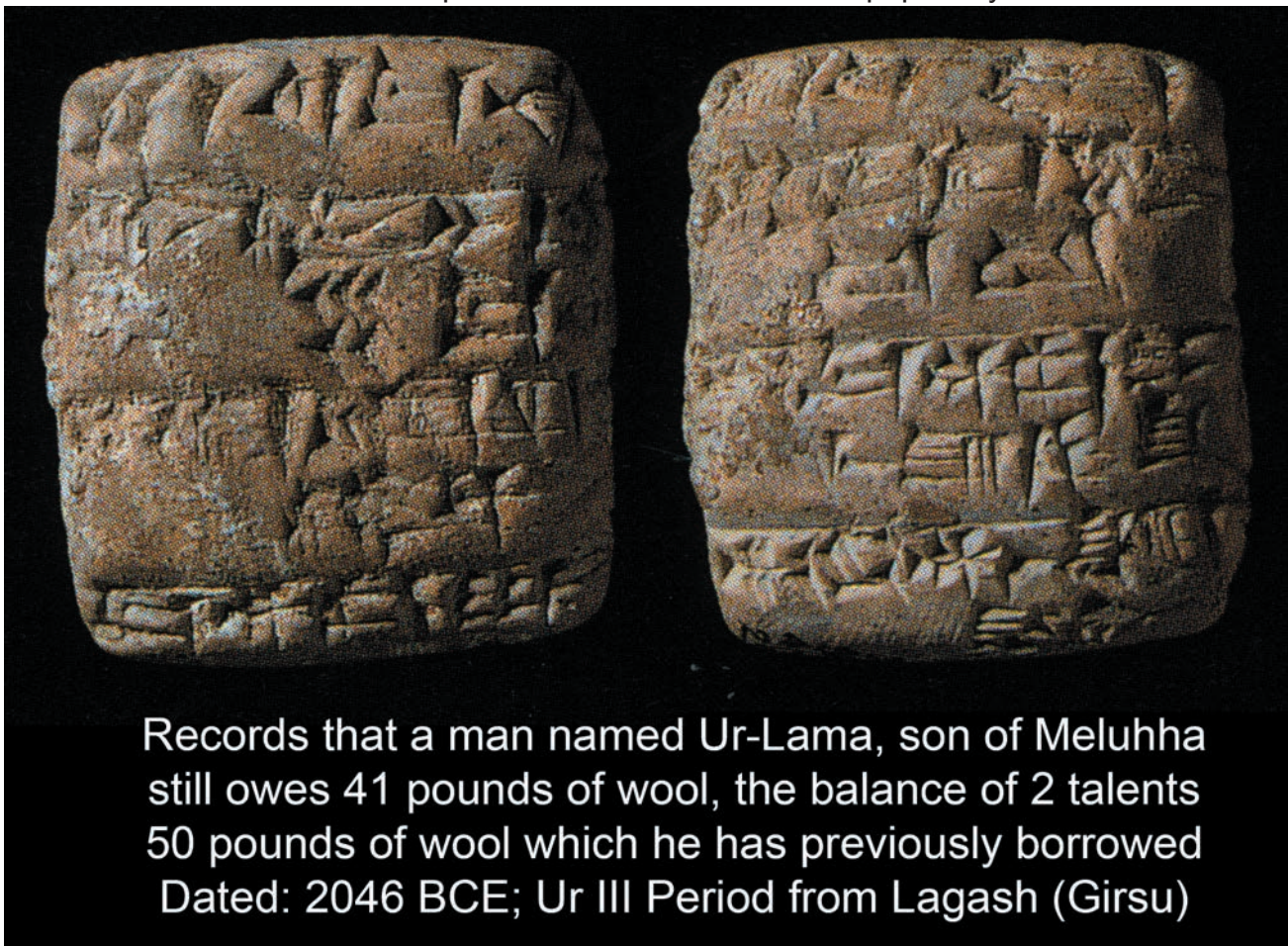


Fig. 2.429: Terracotta tablet from Lagash (Source NHK Catalogue)





Fig. 2.430: Indus style and Gulf style seals from Mesopotamia, Lothal and Dholavira (Source NHK Catalogue)



Fig. 2.431: Carnelian beads from Mari, Syria (Source National Museum, Damascus)



Fig. 2.432: Carnelian beads from Mari, Syria (Source National Museum, Damascus)



Fig. 2.433: Carnelian beads from Ur (Source NHK Catalogue)

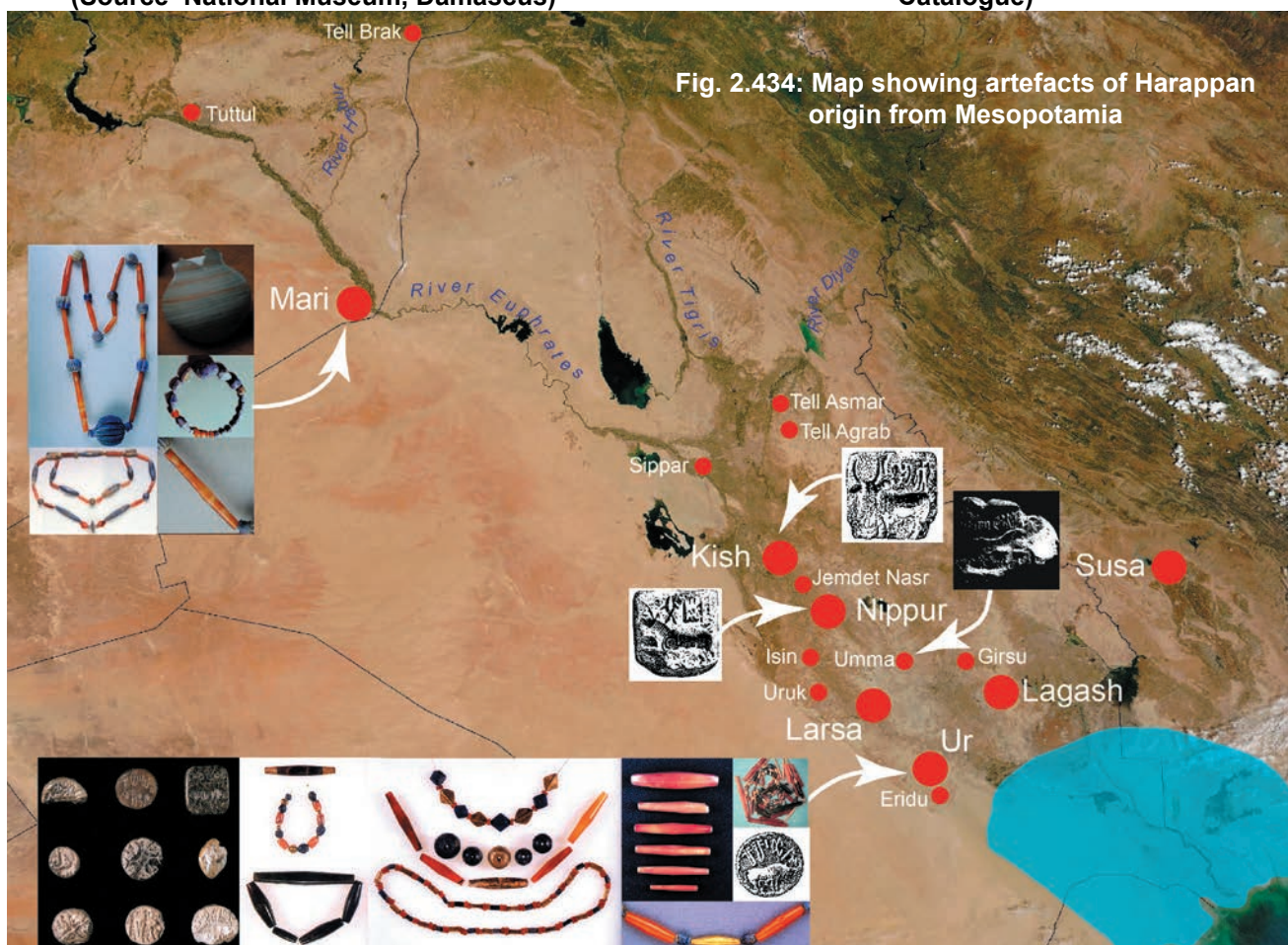


Fig. 2.434: Map showing artefacts of Harappan origin from Mesopotamia



regions as well. The references in the Akkadian records to the ships of Dilmun, Magan and Meluhha tied up in the quay of Akkad (Possehl 1996: 133) shows that the Harappans had their reach directly in this region. Further, the cylindrical seal depicting a Meluhhan interpreter of the Old Akkadian period further substantiates the possibility of Harappan settlements or colonies in the Mesopotamian land to further their trade related activities. The necessity of an interpreter may be for multifarious purposes. The role of interpreter is also felt if delegations or important dignitaries visit a foreign land with a new language and culture. Hence there is a strong possibility that Harappan settlements, or group of Harappan merchants were actually present in Mesopotamia. They could have carried along with them large quantity of native pottery and products apart from the trade items. This is reflected by the findings of typical Harappan pottery from sites in Oman. If typical Harappan pottery could be found at sites in Oman, and, if Harappan trade items and seals could be found from sites in Mesopotamia and Iran, there is every possibility to find evidences related to Harappan settlement or colony or a temporary occupation from the sites they could have actually visited. This possibility, along with the finding of the evidence of Meluhhan interpreter fully strengthens the possibility of the presence of a bilingual inscription from this region as strongly felt by Possehl (Possehl 1996: 138). It has become imperative now to sift through the enormous quantity of archaeological data that had come from the Mesopotamian sites by Harappan archaeologists to segregate the Harappan material, present if any.

2.B.xi Past Conservation Works

The details are enumerated under **Chapter 4.A. ii.a and 4.A.ii.b**





